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LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interests of Lake Carriers, and improve the character of the service rendered to the public.

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LAKE LEVELS AND WIND PHENOMENA.

(Weather Bureau.)

Through the courtesy of the officials of the Engineer Corps, United States Army, in charge of the survey and improvement of the Great Lakes, we have been furnished with a continuous record of the fluctuations in lake level for several months past, at Amherstburg, Ontario, mouth of the Detroit river, and Buffalo harbor, Lake Erie. These records, in conjunction with the continuous records of wind direction and velocity and atmospheric pressure made at the Weather Bureau offices in Detroit and Buffalo, furnish the material for a study of the mechanical effect of the wind in raising and lowering the level of the lake at the points above named.

It has been known for some years that general winds, as distinguished from local winds, blowing parallel to the longer axis of the main body of the lake, have a tendency to heap up the water at the end of the lake toward which they blow, and to depress it at the opposite end. Owing to the convergence of the shore lines at Buffalo the heaping up of waters in that harbor, under the influence of a southwesterly wind, becomes a serious menace to the safety of wharf and dock property. Likewise, owing to the shoal water at either end of the lake, a decrease in the available depth in the harbors and channels produces vexatious delays and frequent groundings.

As a first attempt to correlate atmospheric phenomena and fluctuations of lake level, we have platted the data of wind direction and velocity at the Weather Bureau stations of Buffalo and Detroit, and the fluctuations of lake level as registered by the gauges maintained by the Engineer Corps at Buffalo and Amherstburg respectively, for March, 1900.

The fall in level at Buffalo and the corresponding rise at Amherstburg are due, as is generally known, to the northeasterly winds in front of the advancing storm. As the storm center passes Amherstburg, let us say, the wind shifts or backs, as the case may be, to a westerly quarter; likewise, as the storm center advances successively from point to point between Amherstburg and Buffalo, the winds along the line of movement of the storm center also change direction from an easterly to a westerly quarter. When the shift of wind occurs the water is above the mean level at the western end of the lake and below at the opposite end. The new impulse given to the lake waters by the westerly winds generates a second oscillation in a direction contrary to the first, viz, from west to east, and the cycle of changes is completed when the water finally returns to the level it had before the advent of the storm. The amplitude of the oscillations may reach an extreme value of 6 or 7 feet, but, in general, it is considerably less.

The records thus far obtained show that the oscillations do not occur with all storms, and that a given wind velocity does not necessarily produce a corresponding change in water level.

The period of the oscillation depends largely upon the time the easterly winds prevail, since there will be no reflex movement of the water until the wind changes to a westerly quarter. When this change takes place the concluding phase of the oscillations seems to occupy from twelve to sixteen hours, notwithstanding the fact that the wind may persist at a high velocity.

The second part of the diagram is in some respects similar to the first. It, too, illustrates the passage of a storm, but with this important difference, viz., the center of the storm passed due east across Lake Erie and the wind backed to the northwest instead of shifting to the southwest, as in the first storm. The velocity of the wind was not nearly so high as in the first case. The northeasterly winds of the second storm caused an elevation of the waters at Amherstburg and a depression at Buffalo, as in the first storm; but here the similarity of the phenomena ends. The impulse given the water by the northwest winds seems to have created a transverse rather than a longitudinal oscillation; that is to say, an oscillation across the lake from the Canadian to the American shore, instead of lengthwise of the lake, as happens with northeasterly winds. The synchronism of the times of high water at Amherstburg and low water at Buffalo, and vice versa, is almost perfect. The period of oscillation is likewise fairly constant, ranging from six to eight hours for a half oscillation and from twelve to sixteen hours for a whole oscillation. The computed time of a whole oscillation, assuming the lake to have a mean depth of 50 feet, is, roughly speaking, seventeen hours.

While the information on the subject is as yet too fragmentary to admit of drawing trustworthy conclusions, this much seems to be apparent: The oscillations are stationary rather than progressive. A wave of water is not propagated, in the ordinary sense of that word, from one end of the lake to the other, but the whole lake oscillates about a pivotal or nodal line, which, in the case of longitudinal oscillations, may be said to cross the lake about the longitude of Fairport, Ohio. Although we have no instrumental evidence of the fact, it may be assumed that, as in the case of similar oscillations in other land-locked bodies of water, the oscillations at the nodal line are zero, increasing to a maximum at the respective ends of the lake. Dangerous currents in midlake are not likely to be engendered by these temporary oscillations.

It is within the range of probability that the occurrence of the more pronounced oscillations can be forecast by the Weather Bureau at no distant period.

THERE are 39 shipyards in Germany, employing altogether nearly 50,000 men, and together they constructed last year, 1899, 528 vessels of all kinds for the Navy, the merchant marine, and for river traffic of the larger description. Of these yards five are used for the construction of naval vessels, having an aggregate capacity for the simultaneous construction of over 40 of the largest ships, 28 torpedo destroyers and 30 torpedo boats. Just now the different yards in Stettin alone are constructing 30 large vessels, including the Deutchland (completed), 16,000 tons; a fast steamer of the North German Lloyd, 14,800; and three other passenger steamers of 11,000 tons each. The official statistics show that the German ports were visited during the past year by 140,000 vessels whose combined tonnage was 30,000,000. On September 30 last, Great Britain had 1,347,000 tons of commercial ships in construction, against Germany's 199,000 tons.

SUEZ CANAL TRAFFIC, 1899.

Vice-Consul General Hunter sends from Cairo, statistics showing the canal traffic in 1899, from which the following has been compiled:

Nationality.	Number of Steamers	Tons, net.	Traffic Receipts.
British	2,207	6,628,767 28	$11,658,325
German	378	1,051,149.71	1,627,351
French	223	591,142.72	1,100,610
Dutch	205	438,175.04	777,942
Austrian	102	255,381 48	477,443
Italian	68	132,711.28	247,741
Norwegian	58	122,695.21	216,975
Japanese	62	216 169.51	401,340
Russian	53	167,937 13	350,034
Spanish	37	108,031.77	279,692
Turkish	25	36,282.96	102,129
American	25	64,801.92	136,230
Danish	19	53,145 21	88,409
Portugese	3	1,287.96	2,242
Belgian	5	12,411.15	19,249
Greek	4	8 438,24	14,662
Egyptian	2	1,920.67	5,283
Siamese	1	538.01	941
Chinese	1	1,443.69	2,508
Swedish	2	591 97	1,036
Total	3,480	9,893,022.91	$17,510,142

Mr. Hunter also sends a statement of traffic for the years 1870 to 1898, as follows:

Year.	Number of Steamers	Tons, net.	Traffic Receipts.
1870	486	436,609	$ 838,791
1871	765	761,467	1,465,909
1872	1,082	1,160,743	2,774,779
1873	1,173	1,367,767	4,024,190
1874	1,264	1,631,650	4,374,894
1875	1,494	2,009,984	5,101,142
1876	1,457	2,096,771	5,332,871
1877	1,663	2,355,447	5,824,919
1878	1,593	2,269,678	5,470,715
1879	1,477	2,263,332	5,236,305
1880	2,026	3,057,421	7,043,076
1881	2,727	4,136,779	9,108,419
1882	3,198	5,074,808	10,696,261
1883	3 307	5 755,861	11,687,788
1884	3,284	5,871,500	11,315,350
1885	3,624	6,335,752	11,591,051
1886	3,100	5,767,655	10,570,817
1887	3,137	5,903,024	10,807,093
1888	3,440	6,640,834	12,512,629
1889	3,425	6,783,187	12,770,343
1890	3,389	6,890,094	12,927,912
1891	4,206	8,699,020	16,100,350
1892	3,556	6,832,816	14,370,734
1893	3,342	7 659,558	13,657,963
1894	3,352	8,039,105	14,253,138
1895	3,434	8,448,246	15,084,607
1896	3,408	8 562,237	15,372,899
1897	2,986	7,898,981	14,069,244
1898	3,464	9,186,912	16,230,240

Custom at Port of Boston.—In an action to recover a deficit resulting from voyages of a bark, in determining whether or not a custom exists at the port of Boston for a ship's husband to make advances for disbursing vessels managed by them, and credit interest on all sums received from the date of the receipt, and debit interest on all sums paid out by them from date of payment, where one of the defendants testified that he knew of no such custom, and such defendant had owned a large number of vessels sailing from such port, the master was warranted in disbelieving his testimony. Smith et al. vs. Butler et al., 57 N. E. Rep. (Mass.) 323.

BUFFALO.

Special Correspondence to the Marine Record.

Capt. Fred T. Weimar is appointed master of the schooner Alice B. Norris in place of Capt. Edward Biddlecomb.

The Great Lakes Navigation Co. are about to build two mammoth boats for service between Chicago and Buffalo. Mr. John Gordon is at the head of the company. Mr. Gordon was formerly with Mr. Hill and interested in the management of the steamers North Land and North West.

When the Buffalo harbor improvements are finished this city will be one of the finest ports on the lakes with a straight open harbor four miles long, an opporunity for the same extent of dockage, and a roadstead sufficient to accommodate nearly all its boats on the lakes should they gather together. The old trouble of getting into the narrow entrance to Buffalo river will be removed, and a wide channel, 30 feet deep, will offer easy entrance.

The Congressional Rivers and Harbors Committee is to start from Buffalo on the 7th of August. Lake Erie and lower Detroit river channels will be looked over, and on the 10th, at evening, the party will arrive at Detroit. On the 11th, in the afternoon, one of the Northern Steamspip Co.'s boats will take them on to Mackinac island. Duluth and Chicago will also be visited. I would ask you, why don't these people pay their way?

Sensational accusations against President Keefe and charges of conspiracy to disrupt the Longshoremen's Union are coming thick upon the resignation of Secretary Harry C. Barter, at Buffalo. Mr. Barter gives as a reason for his action ill health and financial loss. An ulterior motive for the resignation is said to exist in the action of President Keefe, who upset all of Baxter's plans for an amiable settlement of the Buffalo grain shovelers' difficulty.

The shipment of bituminous coal for the past week has been quite light. The entire shipment of both grades to the west has not exceeded 76,000 tons, of which Chicago took 34,000 tons, the balance divided between fully a dozen ports; however, Duluth took the moiety and also the total of 2,000 tons of bituminous. The freight rates at which most of the business prevailed may be thus quoted: Chicago, 65 cents; Milwaukee, 60 cents; Duluth, 40 cents; Fort William, 50 cents; Waukegan, 65 cents; Racine, 70 cents; Toledo, 40 cents; Gladstone, 40 cents; Kenosha, 70 cents.

At a meeting of the Shipping Bureau the following schedule of rates on lumber to Buffalo was adopted: From Duluth, Superior, Ashland, Washburn, Red Cliff, Two Harbors and Port Wings, $2 per thousand; from Baraga, Huron Bay, Marquette and Munsing, $1.75; from Grand Marais, $1.65; from Whitefish Bay, Bay Mills, Emerson and Sault river (above locks), $1.50; from Green Bay, Menominee, Ford river and common points $1.50; from Straits of Mackinac, Cheboygan and Lake Huron points, $1.50; from Georgian Bay ports, $1.50. The above rates are adopted after a careful survey of the situation, and the present relation of tonnage and lumber cargoes, and will prevail for the week ending June 28.

Harrington Putnam of New York City, the arbitrator appointed by the court to determine the responsibility for the long-ago collision of the steamer Starrucca of the Union Steamship Company and the Maritana of the Minnesota Steamship Company has handed down his decision. The collision occured just outside the breakwater of Buffalo harbor in the fall of 1898. The Starrucca was badly injured and only had time to get inside the harbor and into shallow water before she went on the bottom. Arbitrator Putnam assesses all damages against the Maritana and exonerates Capt. Robinson of the Starrucca of all blame. The damages amount to about $38,000. Hoyt, Dustin & Kelley of Cleveland appeared for the Minnesota Steamship Company and Potter & Wright of this city argued successfully for the Union Steamship Company.

New York is fighting valiantly for an enlargement of the Erie canal. A great increase in traffic has been seen in the past year, and much of the tonnage is devoted to through cargoes. The shipments westward consist of asphalt, sugar, minerals, stone, resin, cement, salt and general merchandise. Despite a rise in rates the canal charges are far less than rail tariffs. Receipts from the canal in 1840 were $1,416,046, in 1860 they were $4,650,204, and in 1899 they were $2,000,000. With proper improvements it is believed that the canal would regain its former prestige. At a recent convention of the New York State Commerce Association the following was uttered: "Enlargement of the Erie canal to accommodate boats of 1,000 tons would reduce the cost of transportation per ton mile from two mills to two-thirds of a mill. The advantages of a twenty-five foot or deeper waterway from Lake Erie to the Hudson, whereby big boats could sail from the lakes to the sea, is being agitated. This plan will not be economically practicable, for the reason that vessels built for lake transportation are not so strong as ocean boats and so would be unsuited to sea voyages."

CLEVELAND.

Special Correspondence to The Marine Record.

Capt. D. Buie succeeds Capt. Clint G. Ennes as master of the steamer City of Cleveland.

Capt. M. S. Thompson has been appointed master of the steamer Joseph S. Fay in place of Capt. James Connors.

The steamer W. C. Palmer, built, engined and completed at the local yards of the American Ship Building Co., left this week on her first trip. She cleared for Lake Superior.

The Naval Reserves had an elegant outing last week at Put-in-Bay, and the officers were duly photographed before the hotel at that summer resort. The Cleveland boys express themselves as being splendidly handled during the cruise.

The schooners Marion W. Page and Charles Foster, which were brought back from the coast, arrived here all well in tow of the tug Charles F. Dunbar. The vessels were bought by Capt. James Corrigan and they will carry ore for Corrigan, McKinney & Co.

The Detroit and Cleveland Navigation Co. has started its double daily service between Detroit and Cleveland, also vice versa. This completes the service of the company for the season. The boats will make the round trip daily, meaning, that a boat leaves each end of the route night and morning.

Mayor Farley would do well in turning his attention to the handling of the Lake Shore bridge, blocking the entrance to this port, complaints are getting rather too numerous that the railroad company won't allow vessels to enter. A five thousand-ton steamer and a long freight train are heavy objects to come together at any rate of speed.

Last year the shipment of lumber was heavier than it has been in years, and as the consumption of it was light, there remained on the docks the first of this year a vast deal of the product. This prevented any very heavy shipments being demanded the first of this year, and as the shippers were not anxious to move their stuff they forced the rates down.

The schooner Sophia Minch, which went on the beach west of Ashtabula one year ago, the same night as did the schooner Warmington and Canadian steamer Seguin, stranded, is about to be floated. During the last few days of still weather much work has been done and with the use of jacks the boat has been forced into seven feet of water at one end of her.

Coal shippers and vesselmen have been sparring all week over the rate to the head of Lake Superior, and while the local owners agreed not to load any coal for Duluth or Ashland for less than 50 cents and claimed that tonnage was being chartered on the quiet at that figure, some business was done at 40 cents. A little more unanimity and reason among several of the owners would no doubt steady the rate back to the former figure.

June marine reports for Ashtabula have just been completed, and show that all records in ore receipts for one month have been broken. In June 683,883 tons of iron ore were received. Heretofore August, 1897, holds the record-maker, when 626,928 tons were received. Coal shipments for June aggregated 231,113 tons. Last year there were 137,644 tons of coal shipped in June. During the past month there have been 321 arrivals and 323 clearances. An enormous quantity for what we consider a side or minor port.

The appointment of Messrs. Plietz and Judson as the new inspectors of hulls and boilers of the new district, under act of Congress, has created a good deal of comment among the marine community at Toledo. The district embraces Toledo, Sandusky and Port Clinton. There were four inspectors in the old district, DeWolf, McGrath, Pleitz and Judson. The reason given for the appointment of Plietz and Judson is that they are trained men and capable. They reside in geographical civil service district, and the selection is not out of the way, and as the Toledo Blade says, the new district is simply an inspection district, and the appointment does not come under it. An effort is being made, however, to have the appointments of Plietz and Judson recalled, so that men from that inspection district may be appointed. The fault is in the law which does not specify that the hull and boiler inspectors shall be appointed from the new district.

An important patent case, brought by the Boston Towboat Co., against the Chase Machine Co., of this city, which is of special interest to vesselmen, was dismissed in the United States circuit court a few days ago. The case was heard by Judge Clark May 21. The Boston company sued the Chase Machine Co. for an injunction and damages because of an alleged infringement of a patent upon a towing machine. The machine consists of an engine and drum which is used for the purpose of keeping a tow line taut and to prevent sudden strain. The Chase Machine Co. claimed that the two devices were entirely different, although they accomplished the same result. The Boston company secured its patent in 1888, and the Chase Machine Co. was granted its patent in 1895. Judge Clark, in his opinion, said that the defendant's patent was granted eight years after that of the plaintiff and apparently without reference to the plaintiff's patent. He said that that fact raised the presumption that the Chase Machine Co.'s apparatus was new and was not an infringement upon the patent granted to the Boston company. For that reason he dismissed the petition of the Boston Towboat Co. Attorney T. E. Lynch, of Lynch & Dorer, and Col. John O. Winship were attorneys for the Chase Machine Co.

The U. S. engineering department of the district, in charge of Col. Jared A. Smith, received notice from Washington that there has been placed to its credit for the purpose of making certain improvements on the lakes, the sum of $540,000, to be divided among the various ports included in this district. The appropriations were made under the Sundry Civil Bill, which was approved June 6, and gives the following amounts to the funds named: Toledo, $132,500; Black River (Lorain), $125,000; Cleveland, $175,000; Ashtabula, $110,000. In addition to these, from the general appropriation have been requested allotments for dredging at Sandusky, Fairport, Ashtabula and Conneaut.

DETROIT.

Special Correspondence to the Marine Record.

Ralph F. Bogle, assistant general western agent of the Anchor line, died this week at Dalafield, Wis., of Bright's disease.

Rumors of John Gordon's Chicago-Buffalo line are numerous, but there is not much stock taken in them by Detroiters.

The Travis Chartering Co., has placed the steamer Atlantic to carry lumber from Black River to Detroit, at $1.50 per thousand feet.

The Detroit and Saginaw divisions of Michigan naval reseves held an enjoyable coming together this week in commemoration of the anniversary of the battle of San Juan, Porto Rico. I may add that Roosevelt sent apologies for his absence—nit.

The following report for the period from May 16 to June 15, 1900, inclusive, of vessels passing through Detroit river, was furnished by Postmaster F. B. Dickerson: Number of vessels passing through during the day, 1,902; during the night 1,637; total, 3,539. For the season since April 26, 1900, there passed 5,697 vessels, as against 4,604 during the same period in 1899.

Joseph Connors has invented and patented a tarpaulin fastener for securing hatch coverings. It consists of a cable girting the hatch. When the tarpaulin is to be spread, this cable is dropped over it and around the bevel side of the hatch. By means of a screw and bolt the cable is tightened, securing the tarpaulin. Two minutes will cover the entire proceeding. Under the old way it takes from 18 to 20 minutes.

Frank E. Kirby, whose resignation as consulting engineer of the Detroit Dry Dock Co. was announced last week, will remain in Detroit while completing certain engineering contracts now in hand. "I can not at this time state just what my future plans will be," said Mr. Kirby this morning. "I have a number of matters now in hand that take all of my attention. I cannot say whether or not I will retain my residence permanently in Detroit."

The catalogue of the Detroit Lubricator Co. for 1900 is on a plane with all that company's trade literature. It is handsomely gotten up, and illustrated in the highest style of the art. It explains in detail the principles governing the operation of sight-feed lubricators, using sectional view to show the internal construction, and containing cuts of the different styles in parts before being assembled into the complete lubricator, thus enabling anyone to understand their construction and operation thoroughly.

A. A. Schantz's latest is a picture of Lake Erie, with Toledo represented in one corner and Cleveland in the distance. Put-in-Bay and the islands lie in the middle and a Merry Maid in a bathing suit stands on the island with her hands filled with ribbons. She has lassoed a big bulldog at Toledo, and over at Cleveland she has a D. & C. steamer tied to the ribbon. "Connecting the Forest and Maumee Cities" is the title, and it announces that all the boats are running on the new line.

It is understood that the Ohio Board of Works has entered into a contract with Thomas N. Fordyce, of this city, to install a power plant for the propulsion by electricity of canal boats between Dayton and Cincinnati. A State Board of Investigation reported favorably on Mr. Fordyce's plan. The system is to be completed within two and a half years. The canals between Dayton and Toledo are to be equipped within the next four years, so that by 1904 boats can pass from the lakes to the Ohio river and thence down the Mississippi to the Gulf, propelled by electricity.

Construction work is being vigorously prosecuted night and day on the "Soo's" big water power canal, and good progress is being made on the enterprise. A force of men, aggregating about 1,300, is now being employed in the various departments of the work by the contractors—E. D. Smith Co., the Mason & Hoge Co., the T. H. Riddle Co., and H. W. Hubbell & Co., and the Michigan Lake Superior Power Co., the projectors of the mammoth undertakiug. This force will be materially increased in the course of a few weeks. There is great activity all along the line.

This week Judge Wanty handed down a decision in the Ohio case, awarding the demurrage for the use of the boat while sunk and being repaired, amounting to $7,879.20, to the underwriters, and the freight being earned at the time of the loss, amounting to $1,712.55, together with the value of the coal on board, $233.75, to the owners of the Ohio. This is ageeable to the underwriters, but Attorney Shaw, it is understood, will appeal, in which case the underwriters will again fight for the full amount. Next week Friday Judge Wanty will be back in Detroit to conclude the decree and hear an appeal if one is made.

The D. & C. steamer City of Mackinac went above all previous records from Detroit to the Soo on initial trip this year. She left Detroit with an excursion of Ohio coal dealers on Tuesday evening at 7:40 o'clock, and without making a stop reached Sault Ste. Marie at 5:30 p. m. Wednesday, taking just 21 hours and 50 minutes for the trip of 346 miles. When it is considered that through a greater part of the Soo river, 50 miles long, the steamer had to keep down to nine miles an hour the performance is an excellent one. An average of 16 miles an hour was maintained. The City of Detroit, Capt. McKay, holds the record to Mackinac at 18 hours. The Northern Steamship boats run a regular schedule of 19 hours Detroit to Mackinac.

Through the chartering of the Northern Steamship boats to carry coal to Duluth at 40 cents, a temporary break was made in the 50-cent rate, but vessel-owners promptly organized to hold out for the higher price, and many boats are going up light. It is a waiting game, and a defection of an owner or two may still establish the 40-cent rate. Rockefeller may help in maintaining the higher figure, as his Cleveland agent has announced that nothing less than 50 cents will be accepted. Brokers at Buffalo are torn up over the cut from 75 cents to 65 cents to Chicago. The ones who did not cut at first claim the break was needless. However, the great number of lumber hookers and grain carriers in the coal trade has had some effect.

Beeson's Marine Directory of the Northwestern Lakes for 1900 has just been issued by Harvey C. Beeson, of Chicago. The lake authority surpasses all previous issues in the amount of its information and in the convenience of its make-up. A complete list of American steam and sail vessels on the Great Lakes is, of course, the main feature. The rig, statistics, place where built, and owner or manager of each vessels is given. Other features are a list of vessels whose names have been changed in the past three years, lumber carriers of the lakes and the capacity of each of the 438 hookers, vessels lost, instructions and guides for masters, records of engines, and a great amount of useful matter, inluding an excellent map of the lake region.

Col. G. J. Lydecker, United States Engineer, has submitted to the War Department his report on the preliminary survey for improvements in the Sault river. The document will be utilized by the committee on rivers and harbors in preparing its bill for the short session of Congress. The statements set forth that the object of the improvements from Lake Superior to Lake Huron is to obtain a depth of 21 feet and greater width in some places. Deepening of the Hay Lake channel is required, and both deepening and widening at the Neebish where so much serious trouble was had with the Houghton blockade last fall. In addition lengthening of the old canal at the "Soo" is contemplated. Altogether the improvements as outlined by Col. Lydecker will cost upwards of $6,000,000. Every cent of which would and could be expended for the best interests of the country at large.

Frank E. Kirby, for many years chief engineer and designer of the old Detroit Dry Dock Co., of late the Detroit branch of the shipbbuilding trust, will sever his connections July 1. Though Mr. Kirby has for some time entertained a resolution to cut loose from the trust, the fact has not been generally known that he would quit so soon. For a year past, ever since the American Ship Building Co., was formed Mr. Kirby though maintaining an office in Detroit plant, has not taken an active part in the business, though he acted as special designer on particular contracts. Frank E. Kirby has been connected with the Detroit and Wyandotte shipbuilding yards for upwards of 30 years. He began as a young man as designer for the Wyandotte Ship Building Co., and when the Detroit and Wyandotte yards were consolidated, he was placed in charge of the Detroit end. During that time he has built more that 100 vessels and designed parts of many more. During the past few years his fame as a consulting marine engineer has spread beyond the Great Lakes and he has worked up an enviable business on the seaboard. It is quite probable that when he has finally severed his connection with the shipbuilding trust he will remove to New York city and there open a consulting office and confine his efforts to this branch of the business.

CHICAGO.

Special Correspondence to The Marine Record.

The tug Munson is receiving a thorough rebuild at the Great Lakes Tug Co.'s shipyard at this port.

Several old friends of Capt. William Young went from Chicago to Vermillion, O., to attend his funeral.

Henry Sinning, of the Milwaukee life-saving crew, has been put in charge of the Chicago life-saving station.

Grain freights continue at 2 cents on corn to Buffalo, large quantities have been shipped during the past week.

The Canadian steamer Sequin, with lumber from Georgian Bay, lost considerable of her deck load when about 20 miles below this port on the 27th of June.

The old canal schooner John Miner, recently purchased by Capts. Sam R. Chamberlain and Edward Comerford has been rebuilt and is again in commission.

Mandamus proceedings against the Chicago Union Traction Co. to compel it to lower its tunnels under the Chicago river have been deferred until the company can prepare its case.

On account of the holiday little business was done. Rates were unchanged at 2c. All elevators and coal docks will be shut down to-morrow, July 4th, and no brokers will be at their offices except those who have to.

An unknown man, passenger on the steamer Virginia, fell overboard and was drowned when off the north end of Lincoln Park, Wednesday afternoon, June 27th. The steamer was hove too, and a life boat was lowered, but the unfortunate man had gone down.

Charters Wednesday were: To Buffalo, Ericsson, Rockefeller, barge 130, Black Rock, Fitzgerald, Jesse Spalding, corn; to Midland, Seguin, corn at 1½ cents. At Toledo, coal, Concord, Buffalo to Toledo; Ishpeming, Green Bay, 65 cents; Hickock, City of Toledo, hardwood lumber, Charlevoix to Tonawanda, $2.25.

If river dockage has become impracticable, there is yet the opportunity of vast improvements in harbor facilities at South Chicago, where much of the former river traffic has gone in late years. This diversion has been the cause of local jealousy in the past, but may prove the only final solution of the question how to maintain the city's importance as a harbor.

Two lake steamers, costing $1,000,000 each, are to be built for the Great Lakes Navigating Co., and to be ready for launching May 1, 1901, in order that they may make weekly trips between Chicago and Buffalo during the Pan-American exposition. These great liners are to be constructed to meet the need of a through passenger and freight service between the two cities.

Frank Fountain, for many years captain of the life-saving crew at this port, has been transferred to the Charlevoix station. Capt. Fountain has had many years experience in the life-saving service, and is an excellent officer. He is held in the highest esteem here and his many friends' best wishes go with him to his new home and all wish him great success in his noble work.

The steamer Manitou opened the season with 200 passengers for Mackinac island and northern Michigan resorts. The season is regarded as important as it will be taken as an indication by the new company whether a sister ship to the Manitou will be built or not during the coming winter. What the new company desires to do is to have two steamers with daily sailings from Chicago.

Chicago believes it has experienced a change of climate. There is cooler weather, it is asserted, than in former years, and the reason for the phenomenon is found in the drainage canal. "The waters of Lake Superior," it is said, "now run down Lake Michigan and out through the canal, thus cooling off the Chicago atmosphere. The change affects the country for hundreds of miles about."

The monster steamer Cornell, built at the South Chicago yards of the American Ship Building Co., is completed, as far as she can be on the stocks, and preparations are being made for the launch. Invitations announcing the date will be issued in a day or two when white doves will again be liberated, instead of christening with wine. The craft is the property of the Pittsburg Steamship Co.,—the Carnegie line.

The Anchor Line steamer Susquehanna, which left the Armour D elevator early Friday morning, with 115,300 bushels of corn, was detained in the South branch of the river until Saturday evening, notwithstanding the efforts of several tugs to tow her over the Washington street tunnel, which the tugs Dickinson and Morford succeeded in doing Saturday evening, after the dam at Lockport had been closed and the water in the river raised about five inches.

Ralph H. Bogle, aged 39 years, died Wednesday, June 27th, of Bright's disease, at Delafield, Wis., where he had been staying for several months, hoping to regain his health. The deceased had been assistant-general western agent of the Anchor Line at this port nine years, coming from the line's office at Erie, Pa. He had been in the employ of the Anchor Line for twenty years and was held in the highest esteem by his fellow employes and by all who knew him. He leaves a widow and four children. He will be buried at Beverly, N. J.

The retirement of W. I. Babcock from the presidency of the Chicago Ship Building Co., was made the occasion for the presentation to Mr. Babcock yesterday, of a magnificent silver loving cup by the employes of the company. Mr. Babcock has been the executive head of the company since its organization, and was general manager of the company until its absorption by the trust, when he was made its president. In the early days of the enterprise he was associated with the late Emmons Blaine. The presentation was made by O. R. Sinclair, secretary of the company. Mr. Babcock will take a long vacation, and will then probably remove to New York.

THE Hyades, a big steel ocean-going steam collier, which was recently completed at Sparrows Point has made her official trial trip. The trip lasted about four hours and was made down the Chesapeake Bay. The vessel came up to her requirements in every respect. The dimensions of the Hyades are as follows: Length between perpendiculars, 324 feet; length over all, 345 feet; beam, molded, 45 feet; depth, molded at side, 28 feet. There is but a very small bit of wood used in her construction. The hold is divided into four large compartments by transverse water-tight bulkheads. A cellular water bottom 40 inches deep extends from the collision bulkhead forward to the stern pipe bulkhead aft, forming a protection for the whole length of the ship. The engines and boilers are located amidships. The engines are of the inverted, direct acting, triple-expansion type, with cylinders 21 in., 35 in. and 56 in. in diameter, and 42 in. stroke of piston. Two boilers are of the Scotch flue type, 13 ft. 6 in. in diameter and 12 ft. long.

DULUTH—SUPERIOR.

Special Correspondence to The Marine Record.

Work on the new Youghiogheny & Lehigh dock at the East End is progressing quite rapidly and the structure will probably receive coal next month. Work upon the dock was started a year ago last winter and it was expected to be ready for coal last fall but not a shovelful was received. The dock will hold close to 200,000 tons when it is finished. One feature is its cement floor, the only dock in the world having such a floor. The machinery is of the latest pattern.

The exact dimensions of the new dry dock No. 2, at West Superior, has been officially given as follows: Total length of dock, 643 feet; length on blocks, 575 feet; length on bottom, 597 feet 6 inches; width on bottom, 60 feet; width at top of keel blocks, 68 feet; width at top of dock, 106 feet; clear width of entrance at level of blocks, 60 feet 7 inches; clear width of entrance at top (19 feet above sill), 65 feet 6 inches; depth of sill below water (at U. S. government datum), 19 feet; top of after keel block above top of sill, 1 foot.

Samuel P. Ely, who was from 1858 to 1883 heavily interested in mines and railroad ventures in the upper Peninsula, and who was one of the leading residents of this section of the state, died in Paris, this week, aged 75. A cablegram announcing the fact was sent to Hon. Peter White. His remains will probably be brought here for burial beside those of his wife, who like himself, died in Paris while on a visit. Mr. Ely came here as the representative of Boston interests in Marquette county iron mills and railroads. He was a great promoter, among others of his ventures being the organization of the Minnesota Iron Co. The town of Ely, Minn., was named for him. At the time of his death he was interested in the Spanish-American Iron Co., which owns mines near Santiago, Cuba.

The purchase of Mrs. James W. Martinez-Cardeza,s steam yacht Eleanor by President J. J. Hill, of the Great Northern Railroad, has been confirmed. According to the desire of Mrs. Cardeza, it is understood the Eleanor's name has been changed to Wacouta. The Wacouta is built of steel throughout, and is fitted with powerful engines and two boilers of the Scotch type. She measures 232 feet over all, 208 feet on the water line, 32 feet beam, 17 feet 5 inches depth of hold, and 14 feet draft. She is bark-rigged, carrying 10,935 square feet of canvas. Her deckhouse and interior plan give an abundance of living rooms, and throughout the furnishings are most luxurious. Among the conveniences aboard are refrigerating and distilling machines and a complete electric plant. There is no one in connection with lake business, that ought to have, or who could better sup ort, a large steam yacht on the lakes than J. J. Hill. Mr. Hill is the Hanna of the North-West, and, it is quite reasonable for us to say that he is head and shoulders above the Hon. M. A. Hanna.

FLOTSAM, JETSAM AND LAGAN.

It is understood that President Brown, General Manager Wallace and Assistant Fitzgerald, of the American Ship Building Co., are interested with A. B. Wolvin in the building on the lakes of vessels for lake and ocean service.

Of the new Canadian lines of steamers, one, consisting of several large craft, will ply between Chicago and Milwaukee and Georgian Bay. The Canada-Atlantic line, which is Canadian, is already taking millions of bushels of Chicago grain by way of Depot Harbor.

The new steel steamer Strathcona, of the Hamilton & Fort William Navigation Co. (R. O. & A. B. McKay, of Hamilton, Ont.,) is now on her way to the lakes from England. The Strathcona and her sister vessel, the Winona, are 255 feet long, 42½ feet beam, and 23 feet 8 inches deep.

Not long ago Edward F. Cragin announced his leadership of a syndicate that proposed to build dock and elevators on a shoal spot in New York harbor, between Ellis and Bedloe islands, and connect the docks and the shore with a trestle for railway use. The Harbor Line Board, of Buffalo, took the matter into consideration Thursday and will think over it for two months.

U. S. Engineer Jared A. Smith, Corps of Engineers, U. S. A., Cleveland, O., has awarded contracts for dredging away the sand bars at the entrance to the harbors of Fairport, Ashtabula and Conneaut. These bars have formed across the harbors and threatened to keep out the larger boats. As soon as the money recently appropriated is available the work will be commenced.

After lying for two years partly burned and sunk at Toledo, the steamer Periwinkle is to be raised and rebuilt. She came out as a revenue cutter in 1863, with the cutters Fessenden, John Sherman, Andrew Jackson and John A. Dix. All of these except the Periwinkle were sidewheelers; she had twin screws. Her government name was Commodore Perry, and no doubt but that she is a fairly good craft yet for a special service.

THE deadlock in lumber is apparent in the northwest. Wholesale dealers have shown no disposition to buy from the outset, and announced that the rates were too high. Gradually it became known that the true cause of the dealers holding off is that the bulk of their last year's stock is still on their hands, and that high prices of building material, together with the unsettled condition of the labor market, prevents them from paying a fair living freight.

AUTOMATIC TUBS AND BUCKETS.

(BROWN'S PATENTS)

The Brown Hoisting and Conveying Machinery Co., Cleveland, O., make a variety of tubs and buckets for handling bulk cargoes.

The automatic dumping tubs shown in Fig. 1 are designed for handling coal, ore, sand, etc.

Figs. 2 and 3 show, respectively, a one ton dole grab bucket, single rope purchase, used principally for handling coal, and Fig. 3, the shovel bucket, used as illustrated in handling various kinds of bulk, such as iron ore, coal, sand, clay, sulphur, limestone, etc.

The bottom dumping tubs, Figs. 4 and 5, show the square pattern dump tub for handling coal or other material where quick manipulation is necessary. These tubs dump automatically when lowered on to a hopper or other support.

The Brown Hoisting and Conveying Machine Co., Cleveland, are the sole patentees and manufacturers of these products, as also of the universally known cantilever and gantry cranes, cableways, coal and ore handling and storing machines.

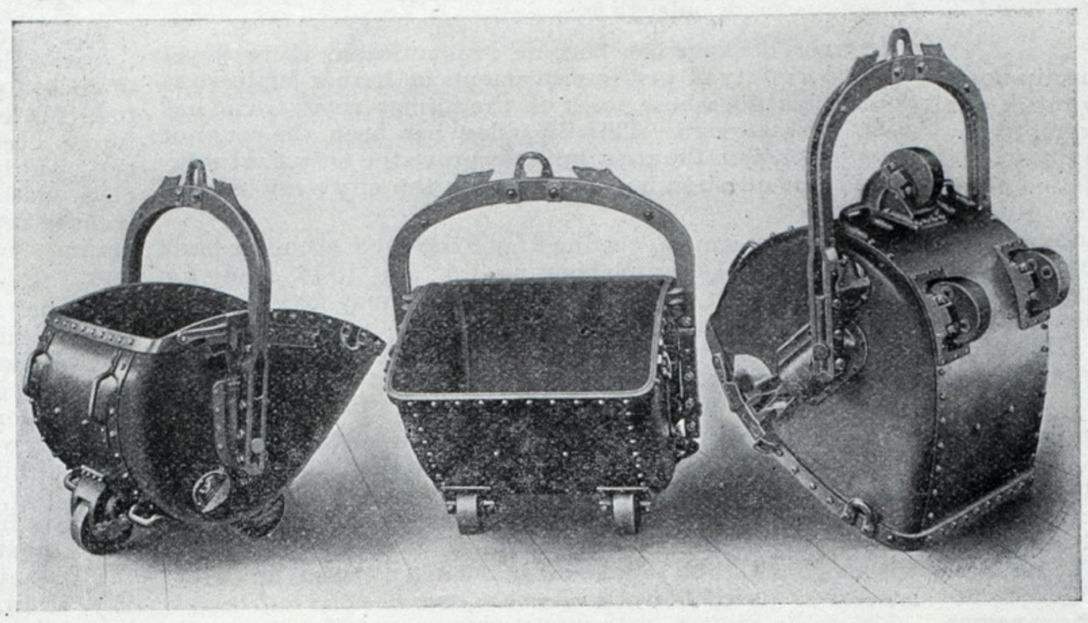

FIG. 1.
AUTOMATIC TUBS AND BUCKETS -- BROWN'S PATENTS.

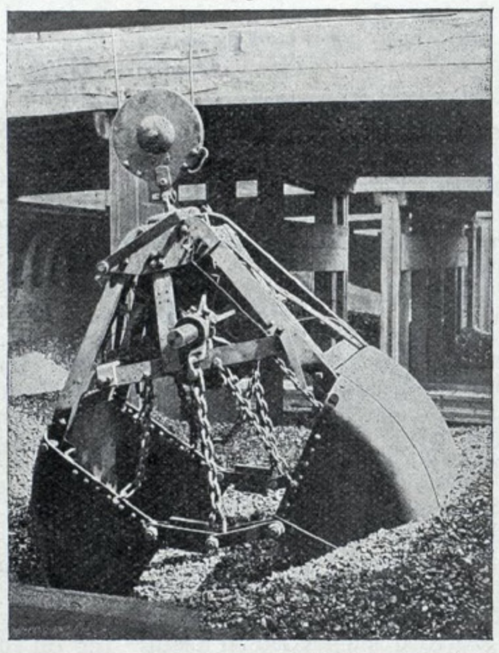

FIG. 2.

FIG 3.

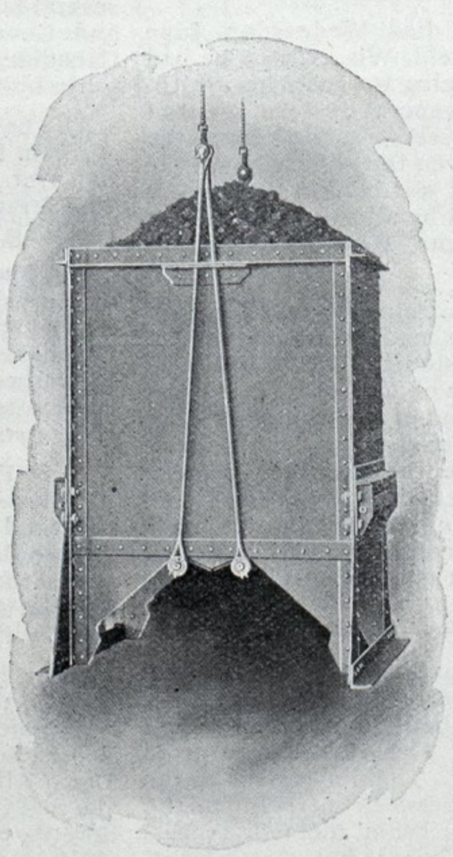

FIG. 4.

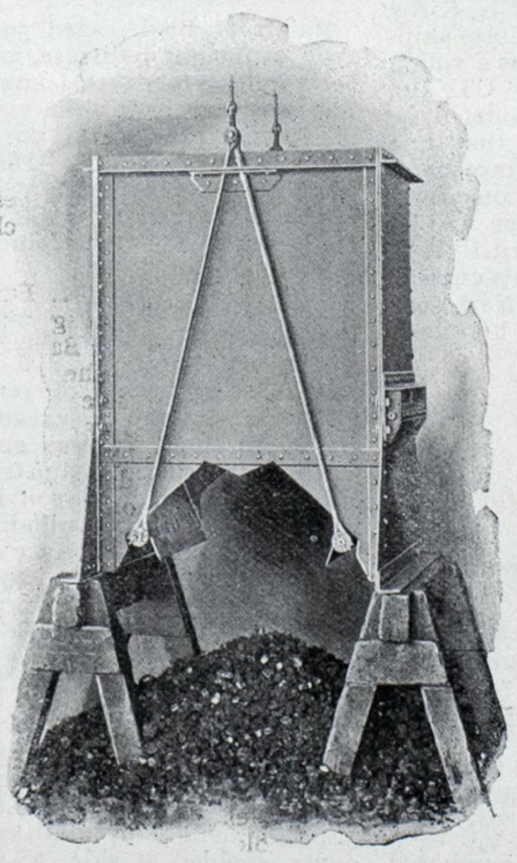

FIG. 5.

A MERCHANT MARINE ON THE PACIFIC.

Hon. Eugene T. Chamberlain, U. S. Commissioner of Navigation, in a thoughtful article in the July number of the North American Review points out a great opportunity which has come to the United States with the rise of new commerce on the Pacific Ocean. The shipping now available on these waters for the transportation of merchandise from the western shores of America to the eastern shores of Asia is not adequate to the demand upon it, and Mr. Chamberlain urges that steps be taken promptly for the creation of an American merchant navy on the Pacific with a view to securing the absolute commercial dominance of the United States on that ocean. This project, he thinks, outranks in importance even the construction of an Isthmian canal:

"It is no disparagement of the ultimate utility of the Nicaragua canal to assert that, to the present generation of Americans, the improvement of trans-Pacific transportation facilities is of much greater importance, and that the enduring interest at least of the grain-growing sections of the Northwest are more closely identified with the latter than with the former undertaking. The Nicaragua canal undoubtedly should and will be constructed as an American enterprise, but it cannot thereby lose its international character. While our political interest in it will, from the begining, doubtless be supreme, our commercial interests, at least for many years to come, from the very nature of things, will not be appreciably greater than those of Great Britain, today the world's ocean carrier. The construction of the canal by the Government of the United States will be a material gift to all mankind, worthy of a great republic. The creation of an American mercantile marine on the Pacific is essentially a national proposition, involving the development of American strength, industrial, political and naval."

MONTREAL hopes to enjoy the advantages of cheap power, electrically transmitted from the Shawinigan Falls, a distance of less than 80 miles. The Shawinigan Water and Power Company announces that early in the summer its works will be completed and the machinery installed. These works consist of a canal and the necessary flumes, to develop 30,000-horse-power, and the construction is such that the amount of power can easily be increased to 75,000 horse-power. The transmission line will be a little less than 80 miles in length and will run along the Great Northern Railway, now being completed, which follows a direct line west from Shawinigan Falls to Joliette. From this point, the transmission line will run in an air line to the end of the island of Montreal, entering the city of Montreal by the most direct route available. The importance of the undertaking will be appreciated when it is known that steam coal is nearly 100 per cent. higher in Montreal than in Buffalo.

In the July number of the North American Review, the editor furnishes his readers with a well-nigh unprecedented collection of masterly articles, many of which bear the names of writers of world-wide fame. It becomes more and more evident each month that the North American Review is essential to the equipment of Americans who would understand adequately the trend of contemporaneous tendencies and events. A thinking man who does not regularly and closely peruse the columns of the North American Review is simply behind the age.

HISTORY OF SUBMARINE NAVIGATION.

Rear-Admiral Philip Hichborn, Chief Constructor, U. S. Navy, in The Engineering Magazine for June, discusses "The Demonstrated Success of the Submarine Boat. The findings of the so-called "Endicott Board" in 1886, he says, first called his attention to the matter. This Board, composed of prominent Army and Navy officers with the then Secretary of War as president, expressed the opinion that submarine boats had not passed the experimental stage. An exhaustive and complete history of this type of naval vessels was appended to the Board's report by a sub-committee, of which General Abbot of the Engineers, and Commander, now Admiral, Sampson were members. To one accustomed to the actions of Boards and to reading between the lines of a report, it was apparent that General Abbot and Admiral Sampson desired to accentuate the probable value of submarines, although the Board as a whole could only be brought to an expression in regard to them which was the merest platitude.

His attention thus drawn to the matter Admiral Hichborn continued a study of the submarine. It appeared that the art of brain-directed submarine navigation has been in process of development for at least three hundred years, and that many of the attempts to make it practicable would have been near enough to success to insure continued effort toward improvement, had it not been for the ultra-conservatism of seafaring folk. William Bourne, an Englishman has the credit of operating the first submarine boat, as such, in contradistinction to a diving bell. The records of Bourne's operations have, however, been lost, as his labors ended more than three hundred years ago.

In 1624 the Hollander, Cornelius Van Drebbel, took twelve persons for an under-water run in his submarine boat, worked by twelve pairs of sculls, and carried "quintessence of air" for them to breathe—probably compressed air. During the succeeding twenty years the main principles of submarine navigation were well grasped, and in 1653 a Frenchman, whose name has been lost, built and operated a submarine boat at Rotterdam. Later in the century an Englishman named Day is reported to have lost his life in a submarine boat of his own invention, through the crushing in of her hull by water pressure due to depth on her second attempt at submersion. After a long hiatus, in the records at least, Bushnell, of Connecticut, projected in 1771 and made operative in 1775, a small one-man-operated boat devised for work against ships at anchor. The boat possessed many of the features recognized to-day as essential for submarine navigation, notably buoyancy.

Fulton, in 1797, was pushing submarine in France. Borrowing the ideas of Bushnell and applying them to more powerful craft, he made a long stride in the methods of under-water work. Fulton's Nautilus was, for her time as efficient as the Holland of to-day—and met with the same kind of encouragement.

The first Napoleon appreciated submarines, just as he appreciated breech-loading small arms. But in both cases he submitted the designs to Boards, and the devices were promptly condemned. The French did not wholly abandon the submarine idea. In 1810 a committee of the Institute reported, after trials of the Coessin boat, that "there is no longer any doubt that submarine navigation may by established very expeditiously and at very little cost."

From 1810 to the time of the United States civil war submarine boats were designed every few years, nearly all of them driven by manual power and most of them following the ideas of Bushnell in forcing them down by an application of power apart from the diving rudder. During the civil war both the Federal and Confederate Governments tried to develop submarines, and failed of success only because the "state of the art" was not studied, and crude devices were tried.

In 1863 the Brun boat, the Plongeur, was built at Rochefort, France, and was one of the first to have mechanical motive power. She lacked diving rudders, attaining her depth solely by variations in weight. As a result there was no control in the vertical plane. Later horizontal rudders were fitted, and the boat worked very well—with the usual result, Admiral Hichborn adds, that she was declared useless by a board, and made into a water tank.

The importance of horizontal rudders was not grasped in spite of experience with the Plongeur. In fact, one of the curious circumstances connected with the development of submarine navigation is that in very few cases does any evidence appear of the study of the art. Almost all inventors began de novo, with the consequence that our late patent files show designs for obtaining results that had been reached a couple of centuries ago. During the last forty years attempts to solve the problem of submarine navigation have been almost constant and the progress has been generally forward, and these years may be considered the era of the power-driven boat. One of the last hand-worked submarine craft was the Intelligent Whale, which attracted much attention because she was bought by our Government and became a United States vessel, although she possessed no feature superior to Fulton's design a half century earlier, and in many principles of design was inferior. She was an example of the power of conservatism, which practically prevented her use for studying the laws of immersed bodies, and was responsible on the one occasion she was operated, for manning her with an incompetent crew and trying her under ridiculous conditions which worked up a fright about the danger connected with her. A press account appeared crediting her with a total of forty-nine victims. As a matter of fact, no life has been lost in her or in any way connected with her from the time she was built in Galveston, just after the close of the Civil war to the present day.

Since 1880 Europe has been experimenting with submarine boats, and in France, Spain and Italy the governments have encouraged the experiments. In France alone has there been government encouragement through a series of years; progress has been so great as to call forth official estimates and requests for the building of a submarine flotilla of 38 boats. The French type developed by the trials with an electric-storage motor boat, the Zede, is a good one, deficient in important details, but sufficently good for the economical and methodical French to be impressd with the great economy that submarines will bring to their mobile coast defenses.

While Mr. Whitney was Secretary of the Navy, proposals were made for submarine boats, with a view to furnishing some kind of protection against gun fire for torpedo boats. Several designs were offered and two propositions to build were made by the Cramps, the designs being those of Holland and Nordenfeldt, the latter of whom had built five or more boats and had sold two to Greece and two to Turkey. The designs differed radically in the very important principle of control in the vertical plane. For submergence Nordenfeldt used vertical acting propellers outside the hull in the plane of the midship's section; consequently stored power was used to pull the boat vertically down against the resistance of her whole greatest longitudinal section and that of her reserve or normal buoyancy. The boat was to be as stiff as possible as regards any inclination of the keel in the vertical plane.

The Holland design was diametrically opposite as regards submerged manoeuvering. As lively a movement as possible in the vertical plane was given by the action of the stern rudder; submergence and rising was attained by pushing the boat by her whole motive power down or up an incline, the angle of which was to be determined by the angle of the horizontal rudder. The Nordenfeldt was a down-haul or sinking design; the Holland a steering under, or diving, device. A dogma was issued by Mr. Nordenfeldt to the effect that the keel must always be kept parallel to the surface of the water, and this dogma was accepted by many naval officers because it was given out authoritatively, although it was never supported by theory, reasoning, or facts.

Both designs proposed steam as the motive power, to be used from a fired boiler while the boat was running on the surface, and from the same boiler with fires hauled as a steam store, or from a chemical heater, when running submerged, and both provided for retained buoyancy.

On March 3, 1893, Congress authorized the building of a submarine boat, and after some competition of designs and other delays a contract for a Holland boat was signed two years later. Details of the design were, by the contract, made subject to the Department's approval, and Mr. Holland claimed that some of these details as required interfered with the efficiency of the boat. This boat, the Plunger, is not finished, the construction having dragged for many reasons. She is now undergoing a change in her surface motive power from steam to gas. Meantime the Holland Co. built a boat of their own design, the Holland, and she, last November, was reported by the Board ordered to observe her functioning, as fulfilling the requirements that had been suggested by the Department.

Two distinct types of practical submarine boats have now been produced, Admiral Hichborn believes; the submarine torpedo boats like the Holland and the French boats, and the bottom workers like the "Travaileeur Sous Marin," in France and the "Lake" boat Argonaut in the United States. The latter boats are intended for work along the bottom, and the "Lake" boat gives good promise of efficiency. She is propelled along the bottom on wheels. At present she is not a true submarine, in that she retains communication with the air by means of a tube.

The securing of our coasts so that our fleet may be free to do its legitimate offensive work is a most important duty. The question arises whether submarines can do it. It is not believed that any battleship, by her gun-fire or otherwise, can prevent the approach of a submarine of the efficiency of the Holland. A sharp lookout by day would reveal the approach of a submarine. By night she might be picked up by searchlight as she rose to correct her course, but the chance for this would be small. When revealed she could be avoided by retreat, owing to her lack of speed. Once within good torpedo range her chance of putting a ship out of the fight by delivery of a torpedo would be excellent; her chance of being hit by a lucky shot from the enemy before her torpedo was sent would be small. The submarine could therefore presumably force a ship away from the point of attack to a distance limited only by the fact that the boat must never move so far from the point to be defended as to allow the ship time to double back after she had been chased off. With a group of submarines some could be held inshore to prevent such doubling. Assuming twenty miles as the distance limit for effective work of submarines, a small fraction of the theoretical radius of their action, a fleet of submarines in the defense would force a blockading fleet to that distance. If the blockading line of ships were forced from the five mile limit at which shore works might be expected to hold it, off to twenty miles, it is clear that the area to be guarded by the blockaders would increase sixteen fold and at least as many ships would be required to hold the line. Considering all conditions and even materially cutting down the efficiency shown on trial, Admiral Hichborn sees no reason why submarines cannot secure our coasts more perfectly than they can be secured in any other way at present practicable. The provision of a number of submarines would give a high degree of coast security, since their presence would result either in the absence of hostile ships or in giving a chance to oppose our small boat with its small crew to a large ship with a large crew, with the chances of war in favor of the boat.

In closing, Admiral Hichborn says: "As a designer of ships, the economy in leading other nations in the adoption of submarines appeals to me strongly. For experience shows that as soon as any particular kind of fighting craft appears in numbers sufficiently large to make the effect of that kind felt, it forces great modifications upon existing types. Whether devices be invented whereby battleships can meet submarines, or whether they will continue to be vulnerable to offshore attacks as now, certain it is that the general appearance of submarines will force important modifications in design; and cestain it is that the first country to accept the modifications will enjoy great comparative advantage in saving in her naval budget."

THE Hancock Inspirator Co. has issued a new catalogue of 40 pages, 6x9 inches, devoted to the well-known Hancock inspirators, of which they are the sole manufacturers, for stationary, marine and portable boilers. All the various types of Hancock inspirators are illustrated and described in detail, and much additional data of value is furnished in directions for connecting and operating, and price lists, which latter it has been found necessary to revise owing to the introduction of new goods. The book also shows the Hancock ejector, "Loftus" automatic injector, Hancock hydro-carbon burner, Hancock purge apparatus, Hancock shaking grate, valves and general jet apparatns which the company makes. Copies of the catologue may be had upon application at the general office of the Hancock Inspirator Co., 85-87-89 Liberty Street, New York.

SHIPPING AND MARINE JUDICIAL DECISIONS.

(COLLABORATED SPECIALLY FOR THE MARINE RECORD).

Witness.—Where an employe of the owners of a steamship was expected to testify for them, but was discharged before the trial for bad conduct and gave testimony on the trial adverse to the owners, but his testimony, on collaterals facts tending to discredit the owners, was shown to be false, he was discredited, and his testimony of no value. The Strathdon, 101 Fed. Rep. (U. S.) 600.

Damage by Fire—Burden of Proof,—Where the theory of the complainant in an action against the owner of a steamship for damages resulting from fire to goods shipped on such vessel is that the fire originated from an overheated flue, from which the cargo was ignited, the burden is on the complainant to establish that the flue was overheated, and that the fire originated therefrom. The Strathdon, 101 Fed. Rep. (U. S.) 600.

Effects of Release.—A receipt in full for all claims under a charter executed by a master at the port of discharge on payment to him of only the freight due does not release the charterers from a claim for demurrage which was also made at the time by the master, and rejected, where the master was compelled to give such receipt in order to collect the freight and did so under protest. Durchman vs. Dunn et al., 101 Fed. Rep. (U. S.) 606.

Damages for Loss of Vessel—Stipulated Value.—It is competent for the parties to a charter to fix the value of the vessel therein as a basis of damages in the event of her loss, and such valuation is conclusive upon them in the absence of fraud or mutual mistake, especially where the vessel was one built as a pleasure yacht, and having no determinable market value. Moore vs. Sun Printing & Publishing Ass'n, 101 Fed. Rep. (U. S.) 591.

Shipping—Demurrage—Construction of Charter.—A provision, in a charter for carrying a cargo of lumber, that the cargo should be furnished "as fast as vessel can receive and properly stow same in suitable hours and weather," has reference to the hours and weather suitable for loading and stowage, and does not exclude time lost by reason of the lumber becoming wet in distant yards, and unfit for loading before it is forwarded to the ship. Durchman vs. Dunn et al., 101 Fed. Rep. (U. S.) 606.

Shipping—Contribution in General Average—Liability of Carrier—Excluding Loss to Ship.—Although the owners of a vessel are exempt under the statutes from liability for damage to the cargo resulting from a fire due to the negligence of one of the crew, without their own neglect, they cannot maintain an affirmative action against the owner of the cargo, for contribution in general average to the ship loss; but, when an action for general average is brought by the cargo owner, the damage to the ship must be taken into consideration, as otherwise the cargo owner could recover by selecting his proceedings for losses for which the ship owner was not responsible. The Strathdon, 101 Fed. Rep. (U. S.) 600.

Construction of Charter—Liability of Charterer for loss of vessel.—A charterer, who bound himself by the contract, to return the vessel at the expiration of the term of hiring in as good condition as at the beginning, "fair wear and tear, reasonable use only excepted," and who also explicitly undertook to be responsible for any loss or damage to any part of the vessel, her equipment and furniture, and to secure the owner in a specified sum against all losses and damages which might occur to her, is not relieved from the obligation to pay the owner her value as fixed in the contract on a failure to return her, by the fact that she was lost without fault on his part, since such contingency might reasonably have been anticipated, and his liability in that event provided against had such been the intention of the parties. Moore vs. Sun Printing & Publishing Ass'n, 101 Fed. Rep. (U. S) 591.

Sufficiency of Facts.—The donkey boiler of a steamship was directly under a deck where a portion of the cargo was stored. The top of the boiler was 10 or 12 feet above the fire, and a flue in its furnace extended from its top to the main boiler funnel, its nearest point to the roof being 19 inches therefrom. The entire shell of the boiler contained water, and there were four transverse water tubes in the interior. Expert witnesses testified that it would be almost impossible for the heat in the boiler to make the flue red-hot; and that such a fire would cause the steam to explode the boiler, if the safety valve did not lift, and warn the men. The use of the boiler did not require a heat sufficient to overheat the flues, and to maintain such a heat was contrary to instruction, and the testimony of witnesses who saw the flue before and after the fire indicated that it had not been red-hot. A former employe of the steamship, who had been discharged for bad conduct, and who was shown to have sworn falsely as to other matters tending to discredit the owners, testified that the flue was red-hot. The cargo was on planks on an iron deck over the boiler room. Between the flue and the deck were three baffle plates, leaving three 3-inch air spaces and and one 10½-inch air space between the flue and the roof. Experts testified that the deck could not have become hot enough to set fire to the cargo. Held not sufficient to warrant a finding that the cargo caught fire as a result of the fire becoming overheated. The Strathdon, 101 Fed. Rep. (U. S.) 600.

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CLEVELAND, O., JULY 5, 1900.

WE are now building on the lakes about $12,000,000 worth of vessel property, and, when the steel market takes a tumble, about double the foregoing amount of steel construction is ready to be placed, chiefly at the several yards of the American Ship Building Co.

TOLEDO is picking up on her draft of water. The record depth of 18 feet 8 inches has been made this week, and, the steamer placed alongside her dock with the iron ore cargo. Other lake ports should try to emulate such an excellent record for receiving deep laden vessels.

ENGINEER WILLIARD, Corps of Engineers, U. S. A., has finished his investigation of the increased current in the Chicago river owing to the drainage canal, and his report has been sent to the Secretary of War. It is said that he finds the speed of the current not to exceed, at any time, two miles an hour.

THE price of steel plates was at one time up to $3.10, and that less than a year ago. At this time they can be bought for $1.40, and although there is still a tendency to drop, it is not believed that plates will go much below the present figure. It is also thought that the combine on shapes and angles will break within a few days, and that investors in ship property will at once contract for future delivery.

THE removal from Chicago to Milwaukee and other lake ports of immense interests in the coal, lumber and grain business, is the theme of anxious discussion in that city. The shallowness of the Chicago river, its obstruction by center piers of bridges, the reversal of the current induced by the drainage canal, all are pointed to by the press as causes for the decline in maritime business that is apparent.

THE course in marine engineering and naval architecture which has been oganized in the engineering department of the University of Michigan will be offered to students with the opening of the university in September. Prof. Mortimer E. Cooley, now professor in mechanical engineering, will give the instruction in marine engineering Herbert C. Sadler, assistant professor in Glasgow University, Scotland, has been appointed junior professor of naval architecture. The course as organized is a graduate course requiring five years' residence at the university. The studies for the first three and one-half years are the same as those in the regular engineering courses. The special work begins the second semister of the fourth or senior year and continues through the fifth year. At the end of the fourth year the student receives the degree of bachelor of science in engineering, and at the end of the fifth year the degree of master of science in engineering.

MEETING OF THE BOARD OF CONSULTING ENGINEERS FOR HIGH-LIFT LOCKS FOR THE CANALS OF NEW YORK STATE, ALBANY, JULY 2ND AND 3RD, 1900.

This Board, which first met at Albany, on April 27th, 1900, and which then adjourned, met the second time in Albany, on July 2nd and 3rd in the office of the State Engineer, Edward A. Bond, by whom the members of the board were selected and appointed.

The meeting has been a most important one to the canal interest of the State, and adjourned at noon of the 3rd after completing its work. The membership of the board is such that its decisions will be considered of great weight in case the 1,000 ton barge canal is built across the State from New York to Buffalo on Lake Erie and from Oswego on Lake Ontario to the Hudson river at Albany.

The last Legislature appropriated $200,000 for the surveys and investigations necessary to a full consideration of this project, and it is intended by State Engineer Edward A. Bond in compliance with the statute, to submit the whole subject to the next Legislature in January, 1901, there being now twenty parties at work in different parts of the state making the needed surveys for the purpose.

When the board adjourned on April 28th to meet on July 2nd, it was to give opportunity for the preparation of plans and estimates of the various designs of locks which were available in order that comparison might be made as to their relative efficiency, economy of time and water and relative cost of construction and of operation.

At the former meeting the attention of the board was mainly given to the details of the Dutton Pneumatic Lock, which had received favorable action by the canal authorities in 1896, and which was fully presented in all its aspects to this board at its first meeting by Mr. Chauncey N. Dutton. It was not therefore necessary that at the present meeting, the Board should further consider this lock, whose features are fully understood by the board and those who have studied the problem.

Plans were yesterday presented by the Buffalo Engineering Co., represented by Mr. Chas. M. Morse, M. Am. Soc. C. E. of Buffalo, N. Y. and Mr. Thomas Ellis Brown, Jr. M. Am. Soc. C. E. and Consulting Engineer of the Otis Elevator Company, for cable counterpoise lift-locks and for hydraulic lift-locks. The present plan for counterpoise lift is a modification of plans provided for a moveble tank or lock-chamber balanced by a counterweight; while the present plans provide for balancing one lock-chamber with another similar chamber; the two conneced by a large number of wire cables passing over sheaves and drums connecting the tank and having safety appliances to prevent drop in case of breakage.

Sketch plans for a hydraulic lift were also presented which provide for two lock chambers or tanks, each supported and raised and lowered by three plungers worked in three cylinders; two locks counterbalancing each other through the water-connections of the two sets of cylinders. These plans include a simple and novel device for preserving the level position of the lock-chambers or tanks and for preventing one end of the moving tank from rising or lowering more rapidly than the other end, a difficulty creating serious trouble with locks of this type constructed abroad.

The board also considered plans for a counterpoise lift-lock designed by Mr. Wm. R. Davis, Asso. M. Am. Soc. C. E. and Chief Bridge Designer of the State Engineer Department, which plans have been prepared and worked out in the Bridge Designing Department of the State Engineer's Office at Albany.

Mr. Davis' device consists of a pair of tanks counterbalancing one another and are supported and raised and lowered upon twelve steel towers supporting 24-foot sprocket wheels, over which travel flat-link chains. These lock-chambers each have inside dimensions of 310 feet length by 28 feet width, with 11 feet depth of water, and which weigh when loaded, whether with boat or without boat, 5,500 tons each.

These tanks thus counterbalanced are raised and lowered by electric power developed by turbine wheels, the power being automatically cut off when the tanks reaeh the proper level, and the machinery being so interlocked as to prevent any movement of the machinery until the lock-gates are fully closed or fully opened and the boats have entered or left the lock-chamber. The lock-chambers or tanks, being immovable when the gates are open.

In preparing these plans, Mr. Davis has made no use of any feature of any other plans, and it is said by one of the members of the board that the details and estimates for the Davis lock have been worked out and prepared in a very thorough and systematic manner, so that these in all their details serve as a standard of cost for comparison with other locks.

The board also gave much time to the consideration of sets of ordinary masonry lift-locks and to the subject of comparing the amounts of water and of time needed for the operation of different locks.

In considering ordinary lift locks, it appears that there is no need for any single lift exceeding 27 or 30 feet, although the board would not hesitate to advise using higher lifts than 30 feet if the conditions favored it.

The board consists of Mr. Elnathan Sweet, former State Engineer and chairman of this board; Maj. Dan C Kingman, Corps of Engineers U. S. Army; Mr. George S. Morison, ex-president of the American Society C. E. and member of the Isthmian Canal Commission; Maj. T. W. Symons, Corps of Engineers U. S. Army, Buffalo, N. Y.; Prof. W. H. Burr, of Columbian University and member of the Isthmian Canal Commission.

State Engineer Bond indicated to the board at their meeting on July 2nd the general outline which he desired that the board should discuss in their forthcoming report, which report will soon be prepared after the adjournment of the present meeting, which adjournment was made at noon of July 3d.

On the evening of July 2d, Col. John N. Partridge, Superintendent of Public Works, entertained, at the Albany Country Club, the members of the Board of Engineers and State Engineer Edward A. Bond; Deputy Superintendent of Public Works Elon H. Hooker; Deputy State Engineer Wm. Pierson Judson, and Consulting Engineers T. C. Leutze and D. J. Howell.

AFTER all has been said and done the New York Maritime Register covers the late casualty in saying that the most terrible accident of its kind in this or any port of the world took place last Saturday afternoon. A fire, originating in a bale of cotton on one of the docks of the North German Lloyd, resulted in a frightful conflagration, destroying hundreds of human lives, three beautiful vessels of the Bremen line, the Bremen, Saale and Main, also all four docks belonging to said company, and the adjoining piers of the Thingvalla line and the big warehouse of Campbell & Co. The Kaiser Wilhelm der Grosse has fortunately escaped with slight damage; the total losses will reach many million dollars. The fire spread with such rapidity that the fire apparatus was entirely inadequate. While we primarily express our deep regret at the loss of many human lives, we also offer our most sincere sympathy to the North German Lloyd, which has done so much in the past to make the ocean travel of passengers comfortable and secure and the traffic of merchandise fast and reliable.

TO charge that the canals do not help other cities than those of their terminals is to state that which can be refuted by the experience of all great waterways or railroad routes in an agricultural and manufacturing and producing country. The Buffalo Evening News very pertinently states that Canada is devoted to her canals and claims to be the rival of the Empire State. In Germany the same process of betterment and extension of canals and water routes is continued. During the past year the new canal from Dortmund to Emden has been completed and opened for traffic. In Russia even greater efforts have been devoted to the development of the water routes on canals and rivers, the sum of $30,000,000 having been expended from 1891 to 1896 for this purpose, and in the same period the internal water traffic has increased by 70 per cent.

THIS week produces a holocaust. At the docks of the North German Lloyd, New York, were the Saale, a single screw passenger steamship of 4,965 gross tons, the Bremen, a twin screw passenger and freight of 10,526 tons, and the Main, a twin screw freight and passenger steamship of 10,200 gross tons, all caught fire and were burned to the water's edge. The Kaiser Wilhelm der Grosse was the only one of the four big vessels at the dock that escaped. To the north of pier No. 1 was the dock of the Hamburg-American line, at which the steamship Phœnicia, a twin screw passenger steamer of 6,761 gross tons, was docked. The flames got a good hold on the Phœnicia, and she was towed out into midstream ablaze, but, ultimately, with little or no damage.

THE UNITED STATES MERCANTILE MARINE.

The Bureau of Navigation states that during the fiscal year ended June 30, 1900, the total tonnage officially numbered amounted to 417,034 gross tons. Full returns from Honolulu will not be received for a fortnight, but about 38,000 tons of Hawaiian vessels were entitled to American documents under the act of Congress creating the Territory of Hawaii. Porto Rican vessels were also, by act of Congress, entitled to American documents, but they aggregate less than 1,000 tons. Complete figures will probably show that the actual additions to the American merchant fleet during the year have surpassed the 437,846 gross tons documented during the fiscal year 1874, when the law required all canal boats in domestic trade to be documented. In that event, the additions to our merchant fleet during the past fiscal year will have been greater than during any year since 1856.

The figures will be slightly reduced by the fact that the issue of official numbers and of marine documents are not simultaneous.

The vessels built in the United States and officially numbered during the year aggregate 381,863 gross tons. This record was surpassed in 1874 when 432,725 gross tons were built in the United States and documented. Of the new vessels built during the year, 483 of 213,052 gross tons are steam vessels, 575 of 92,625 gross tons are sail vessels, including barges with sail power, and 76,186 tons are barges and a few canal boats for Canadian trade without power of self-propulsion. The large proportion of steam vessels, 56 per cent. of the total, makes this year's addition to the fleet in value and in carrying power superior to the additions in 1874 or of any other year in our history.

The most important additions of the year have been the large steel vessels built for the trade of the Great Lakes. They include the James J. Hill of 6,025 gross tons, the largest merchant vessel built in the United States during 1900, nine other lake steamships and two steel schooner barges, each of over 5,000 gross tons, and five lake steamships of over 4,000 gross tons. On the seaboard the largest vessel built is the steamship California, 5,879 gross tons, launched at San Francisco, which will be the pioneer vessel in opening regular steam communication between Hawaii and the Atlantic ports of the United States. No other vessel of 5,000 gross tons or over on the seaboard has been numbered during the year, but six steamships of over 4,000 tons each for the Atlantic coasting trade have been built.

The only vessel built during the year exclusively for the foreign trade has been the steamship Maracaibo of 1,771 gross tons for the Red D line in the Venezuelan mail trade.

The sister steamships San Juan and Ponce, each 3,503 gross tons, and the Porto Rico, 1,257 gross tons, giving the Island the best means of steam communication with the United States it ever had, are the first maritime results of the annexation of Porto Rico. The steel ship Edward Sewall, 3,206 gross tons, and the steel bark Kaiulani, 1,570 gross tons for the Hawaiian trade, are the square rigged vessels built, but eleven schooners each of over 1,000 gross tons were constructed for the Atlantic coast trade.

Additions from sources other than construction during the year have been repaired wrecks 9,843 tons, Hawaiian vessels numbered at San Francisco since June 14, 8,631 tons, vessels sold to citizens by the Government 7,326 tons, admitted by special acts of Congress, 5,754 tons, American vessels returned from foreign flags, 3,607 tons.

Full returns will probably show that the total documented tonnage of the United States on June 30, 1900, for the first time since 1865 has again reached 5,000,000 gross tons. The tonnage registered for foreign trade, however, will probably be slightly below 848,000 gross tons, the figures for June 30, 1899. The increase of the Alaskan trade, carried on mainly by registered vessels, has checked somewhat during the year the steady decline in American tonnage registered for foreign trade.

Of the 1,058 steam and sail vessels of 305,677 gross tons built and numbered during the year, 98 of 185,434 tons were steel, 957 of 119,355 tons were wood, and three of 888 tons iron. The proportion of steel construction is thus much the greatest in our history. This result is attributable also to the Great Lakes construction, where of a total of 99,776 gross tons, 95,015 tous, 25 vessels, were steel steam vessels. The numbered construction on the Atlantic seaboard comprised 715 vessels of 160,576 tons, of which 76,344 tons were wood. Numbered construction on the Pacific comprised 37,386 gross tons, and on the Mississippi, Ohio and western rivers 131 vessels of 7,939 tons.

For purposes of comparison, vessels under construction in Great Britain on March 31, the latest figures available, were 554 of 1,260,422 gross tons, of which 115 were ocean steel steamships of 4,000 gross tons or over, 17 being of over 10,000 gross tons. During the three months ended March 31, Great Britain launched 129 steamships of 264,208 gross tons. On that date British vessels under construction were 125,000 tons less than for the corresponding date in 1899.

TRAFFIC THROUGH THE ST. MARY'S FALLS CANAL.

STATISTICAL REPORT OF LAKE COMMERCE THROUGH CANALS AT SAULT STE. MARIE, MICHIGAN AND ONTARIO, FOR THE MONTH OF JUNE, 1900.

EAST BOUND.

Articles	U S. Canal.	Canadian Canal.	Total.
Copper.....net tons	22,858	50	22,908
Grain.....bushels	1,936,473	64,000	2,000,473
Building stone.....net tons	3,092	920	4,012
Flour.....barrels	564,306	96,405	660,711
Iron ore.....net tons	2,642,554	99,188	2,741,742
Iron, pig.....net tons	1,348	.....	1,348
Lumber.....M. ft. B. M.	129,113	1,023	130,136
Silver ore.....net tons	.....	.....	.....
Wheat.....bushels	2,837,474	2,091,697	4,920,171
General mdse.....net tons	5,734	1,184	6,918
Passengers.....number	2,137	1,217	3·354

WEST BOUND.

Coal, hard.....net tons	61,820	12,150	73,970
Coal, soft.....net tons	602,191	95,452	697,643
Flour.....barrels	.....	.....	.....
Grain.....bushels	.....	.....	.....
Manufactured iron...net tons	18,709	3,354	22,063
Salt.....barrels	23,998	3,000	26,998
General mdse.....net tons	52,900	4,782	57,682
Passengers.....number	2,443	1,037	3,480
Freight—			
East bound.....net tons	3,073 702	178,514	3,252,216
West bound.....net tons	739,219	116,167	855,386
Total freight.....net tons	3,812,921	294,681	4,107,602
Vessel passages—			
Number.....	2,464	434	2,898
Reg'd tonnage.....net tons	3,098,094	337,574	3,435,668

Compiled at St. Mary's Falls canal, Michigan, under direction of Lieut.-Col. G. J. Lydecker, Corps of Engineers, U. S. A. Joseph Ripley, Asst. Engr. and Genl. Supt.

LETTERS AT DETROIT MARINE POST OFFICE.

July 7, 1900.

To get any of these letters, addressees or their authorized agents will apply at the general delivery window or write to the postmaster at Detroit, calling for "advertised" matter, giving the date of this list and paying one cent.

Advertised matter is previously held one week awaiting delivery. It is held two weeks before it goes to the Dead Letter Office at Washington, D. C.

Abrams, Geo., Iron Duke.
Akar, J. H.
Barler, Mell, Smith No. 2.
Brown, Wm. W.
Black, L. C.
Brough, W. A.
Bailey, Will, A. A. Carpenter
Crossen, Frank, Tilden.
Conners, Bert.
Coty, Wm.
Carroll, Agnes.
Carson, Jim.
Cavanaugh, M. F., 2, Ward.
Cudmore, Mike, Hurlbut.
Decker, Nick, 2.
Decker, Loran.
Duffy, Lee, Hennepin.
Ellery, Capt. A., Clinton.
Facht, S., Romania.
Gracey, Annie.
Greening, Geo.
Gardner, Edith.
Grant, Reuben.
Gross, John.
Higgins, John, Tokio.
Hempton, Wm.
Jesper, Mr.
Jamieson, Malcolm.
King, J. L.
Kelly, John.
Lyons, Capt. R. A., Bermuda
Lecuyer, Alf. T.
Lattimer, Ralph.
Lay, John.
LeClair, Jas., 2, Cort.
Myers, Frank, M. Richards.
Murphy, Jno., Lyon.
Mondy, W. A., Sitka.
Monroe, C. D.
Miner, C. G., Doty.
McArthur, D. J.
McWilliams, A. F.
McIntyre, Rory.
McNut, Mordie.
McDonald, Richmond.
Noonas, Jos.
O'Donnell, Fred, Houghton.
Patchett, A. B., R. Fulton.
Roberts, Bert, 2, Elphicke.
Rood, Herb, Traveler,
Reynolds, Ray.
Remington, Fred.
Ryan, John, America.
Romk, F. M., LaSalle.
Stuart, Fred., Hebard.
Sweeny, M. F.
Thurston, Wm., St. Paul.
Wineland, Jno.
Willey, Fred, Presque Isle.
Williams, Jno., W. E. Reis.
Walker, P. W., Wyoming.
Wass, Geo., St. Paul.

F. B. DICKERSON, P. M.

"This," said the sergeant of marines who was showing her over the battleship, "this is the quarterdeck." "Oh!" she exclaimed, feeling for her purse, "I thought it was all free."

TO SURVEY HARBORS.

Capt. Graham D. Fitch, U. S. Corps of Engineers, stationed at Ogdensburg, N. Y., has reccommended to the officials at Washington that the harbors of Oak Orchard, Olcott and Sacket Harbor be surveyed that data regarding their conditions at the present time may be obtained for the bulletins issued for the benifit of commerce.

The harbors mentioned have not been surveyed in many years. Capt. Fitch, has also received notification to make a general examination of the Grasse river from its confluence with the St. Lawrence river to Massena with a view to obtaining depth of twenty-one feet, and also to examine the St. Lawrence river at the head of Long Sault Island with a view of the removing the rock obstruction in the South branch of river so as to give a navigable depth of twenty feet of water. The orders from headquarters are called forth by requests from persons interested in the contemplated Massena canal, who desire using the river of that name.

The Massena river is a small stream, only three feet in depth and to deepen it to twenty-one feet means a big expense. The matter of surveying alone would in all probability cost a thousand dollars. Capt. Fitch will go to that neighborhood in the near future to determine the advisability of the government expending so much money, by inquiring into the present commerce and trade and the outlook for the future commerce there. Capt. Fitch only awaits the appropriation by the officials of about $75 to cover the expense of the trip and the examination of the rivers.

LAKE SUPERIOR LEVELS.

The mean level of Lake Superior in June, by the U. S. gauge at Marquette was 0.62 foot above low water datum. This is 0.07 higher than for the preceding month, but the rise is 0.25 short of the nominal rise, which is 0.32 foot from May to June according to J. H. Carling, U. S. Asst. Engineer.

This stage for June is 0.59 foot lower than in June 1899, a year ago, which was a high water year, but is still 0.08 higher than the average June stage for the 26 years from 1872 to 1897.

U. S. Forecast Officer Richardson states that the rainfall last month at Duluth was only 1.05 inches, the normal for June being 4.59, thus showing a deficency of 3.54 for the month. The total deficiency this year, from Jan. 1, to June 30, is 10.54 inches. Last month was the driest June in the last thirty years. The next driest June was in 1884, with 1 13 inches, while the wettest was in 1874, with 10.89 inches rainfall.

The monthly Meteorological Chart of the Great Lakes, issued by the Weather Bureau under date of June 30, 1900, contains the following summary of rainfall and water levels for the entire lake region, and is of interest in this connection :

The rainfall in the lake region during the first week in June was fairly abundant, but for the remainder of the month it was considerably below the seasonal average. The general condition, as regards rainfall, is slightly less favorable than it was a month ago ; that is to say, the deficiency for the American watershed, noted on the previous issue of this chart, has been increased about 3 per cent. The greatest deficiency at the present time exists at the head of Lake Superior, where the seasonal fall has been only about 30 per cent. of the normal. A like deficit, however, does not exist at any other point in the watershed of Lake Superior. The rainfall for the whole watershed from March 1 to date is about 70 per cent. of the normal seasonal amout. The level of the water in Lakes Superior, Michigan, and Huron is less than it was a year ago by about 3 inches. The level of Lake Erie, at Cleveland, is higher than it was for the corresponding month of 1899 by about the same amount, while Lake Ontario maintains about the same stage that it had a year ago. * * *

Owing to the diminished seasonal rainfall little further increase in level may be looked for during the remainder of the season.

THE expedition to the sunken steamer Pewabic, in the Mary Mills, has resulted in failure and the boat returned to Milwaukee. Last winter the Mills was overhauled and equipped to handle the big diving bell by which all the copper has been taken from the wreck of the Pewabic. As soon as it grew warm this spring, the Mills started for Thunder Bay in Lake Huron, prepared to bring back all valuables left in the wreck, but the trip resulted in nothing being accomplished. It is possible that this may be the last effort to recover anything from the little old sunken hull lying in about 30 fathoms of water. Her former master states that there was nothing very valuable in the little hull when she foundered.

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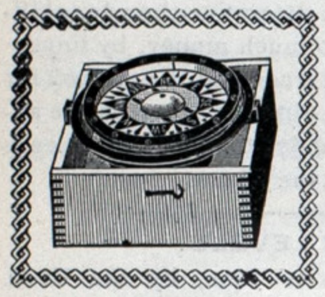

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RAINFALL AND WATER LEVELS IN THE LAKE REGION.

The rainfall in the lake region during the first week of June, as reported by the Weather Bureau, was fairly abundant, but for the remainder of the month it was considerably below the seasonal average. The general condition, as regards rainfall, is slightly less favorable than it was a month ago; that is to say, the deficiency for the American watershed has been increased about 3 per cent. The greatest deficiency at the present time exists at the head of Lake Superior, where the seasonal fall has been about 30 per cent. of the normal. A like deficit, however, does not exist at any other point in the watershed of Lake Superior. The rainfall for the whole watershed from March 1 to date is about 70 per cent. of the normal seasonal amount. The level of the water in Lakes Superior, Michigan, and Huron is less than it was a year ago by about 3 inches. The level of Lake Erie at Cleveland is higher than it was for the corresponding month of 1899 by about the same amount, while Lake Ontario maintains about the same stage that it had a year ago. The level of the various lakes for May above mean tide at New York City as determined by the officials of the Engineer Corps, United States Army, was as follows: Lake Superior, 671.74; Michigan, 579.91; Huron, 579.69; Erie at Amherstburg, 572.40, at Cleveland, 572.48; and Ontario, at Oswego, 246 08 feet. These values, as compared with mean levels during April, 1899, shows the following differences: Lake Superior has risen .17 foot; Michigan .24; Huron, .27; Erie, Amherstburg, .18, at Cleveland, .16; and Ontario, .19.

Owing to the diminished seasonal rainfall little further increase in level may be looked for during the remainder of the season.

BETHLEHEM STEEL COMPANY.

As an evidence of progress in western engineering, it may be noted that the city engineer of Chicago recently placed with the Bethlehem Steel Co. an order for a hollow forged shaft to replace a breakdown in the north side pumping station at that city. The new shaft, which measured 13 feet 8½ inches in length, 19 inches in diameter and weighed close to 10,000 pounds, was booked on May 30, and, under special emergency instructions, was hollow forged, annealed and rough machined in time to go forward June 9. Many of the power stations in Chicago and other Western cities are equipped with shafts of this description, but this is the first time a hollow forging has been specified for water works engines in that section of the country. The remarkably short time required by the Bethlehem plant for the production of such a shaft is worthy of note, but the manufacturers claim that their complete facilities enable them to meet just such emergencies, in addition to the large volume of general business which constitutes their regular output.

The Bethlehem Company now have in hand the entire equipment of steel shafts and engine forgings which are to go into the new steamer building by Harlan & Hollingsworth Co. at Wilmington, for the Mallory Line. These forgings are to be made of a high-grade of open-hearth steel, forged under hydraulic pressure and carefully annealed in accordance with the standard practice of those works. They are also making all the shafts and forgings for the 11,000-ton steamer which is to be built by the Union Iron Works of San Francisco for the American-Hawaiian S. S. Co. In this instance the owners saw fit to recognize the character of the Bethlehem work by specifying that all the parts mentioned should be made at that plant, a most gratifying testimony to the good effect of the campaign in favor of a higher standard of material and workmanship in such important features of marine construction.

The U. S. Army 18-inch guns which the Bethleham Steel Co., of South Bethlehem, Pa., is manufacturing for the War Department to be used in firing the Gatherman torpedo is nearing completion. It will weigh, without its carriage, 59.6 tons, and will be proved by firing ten rounds of solid shot, each weighing 2,000 lbs., and each requiring 450 lbs. of powder to secure the necessary velocity. This test will be extremely interesting, and will take place some time in July at the Bethlehem Co's. proving grounds, which are located at Redington, Pa.

WRECK AND CASUALTY REPORT FROM MAY 16 TO JUNE 15, 1900, INCLUSIVE.

May 26—Steamer Nebraska stranded at Port Hope, Mich., during dense fog; released the next day; damage to hull, $1,500.

May 28—The steam barge Coffinbury and the tow barge Checotah went on the rocks at Thunder Bay Island during the prevalence of very dense fog. They were released the next day; damage to Coffinbury, $5,000; to Checotah, $2,500.

May 28—The schooner Silver Lake was run into and cut in two by the car ferry Pere Marquette during the dense fog about 3 a. m., when about 15 miles east of Manitowoc. Loss to schooner, $1,500; cargo, $500. Henry Eastman, one of the crew of the schooner, was drowned.

May 30—Steamer Havana stranded on south point of Plum Island at 2:45 p. m. during prevalence of heavy fog. Ship was released next morning without damage.

May 30—Steamer Oswego went ashore at the head of North Manitou Island at 8 p. m. during fog. Vessel was released, damage, $1,000.

May 30—Steamer Seguin stranded at McGulpin's point, north of Cheboygan, in the fog; was released next day; damage, $1,000.

May 31—Steamer Wanderer ran upon a shoal during fog, just above St. Lawrence Park; she was liberated in the afternoon and was uninjured.

June 13—Steamer Pine Lake ran aground at Sleeping Bear Point during fog; she released herself and was uninjured.

NOTE—In the record of wrecks and casualties for 1899, Lake Superior, barge No. 115 was reported ashore on Pic Island. The barge has since been abandoned as a total loss; estimated value of vessel, $70,000; cargo, $7,500; total, $77,500.

NOTES.

A NEW process for hardening and toughening armor plate has been patented in this country by Emil Ehrensberger, Essen, Germany, who has assigned his interest to Fried. Krupp, of Germany. The process consists in first heating the plate to a very high temperature, which permits an easy or ready flow or rearangement of the molecules, and the entire plate is then suddenly cooled from such temperature by immersion or spraying in the ordinary manner. By this means the steel acquires not only considerable hardness, but also an extreme fineness of grain or texture, which makes it capable of subsequently acquiring the greatest degree of hardness. But as this hardness is too great to allow of machining or shaping the plate, it is again heated to a temperature at which hardening will not take place, and the plate is then cooled suddenly from this temperature. Then it may be worked into the required shape while cold, after which the side intended to be exposed to the impact of projectiles is heated to a temperature adapted to produce the required degree of hardness. At the same time, the other side is heated to a temperature below that to which the exposed side is heated, this latter temperature being such as to produce toughness. The plate is then suddenly cooled either by immersion or spraying.

THE British Admiralty has been fully convinced that aluminum is a metal worthy of consideration and adoption. About three years ago six torpedo boat destroyers of the Bat type were fitted by the contractors with aluminum bed plates for their electric light engines and dynamos, and the test proved satisfactory. More recently about three tons of aluminum have been employed in the Condor and Rosario gunboats, in the construction of the gun racks, mess racks, etc., as castings, plates, angles, rivets and screws. It is calculated that a saving of six tons in weight above the water-line has thus been effected in each vessel. At the present date, aluminum is entering largely, and wherever possible, into the construction of electrical appliances of a battleship and a cruiser, which are being built for the British navy; and similar remarks also apply to the Viper. In contradistinction to the Admiralty, the British War Office is still "considering" whether aluminum possesses any advantages for military equipment. Many of the volunteers in South Africa have aluminum water-bottles and mess-tins; but if any of the regulars carry such articles, it is only by way of experiment. The London Engineer thinks by the time the present war is over, and there is no longer any immediate anxiety about overworked horses and overloaded infantry, the English War Office may realize that in Germany, Russia, France and America, the new metal has been taken up seriously by the military authorities for severral years past, and we have yet to learn that in any instance where aluminum has been adopted by foreign nations for a sensible purpose it has proved a failure or imperfect success.

NOTICE TO MARINERS.

UNITED STATES OF AMERICA—NORTHERN LAKES AND RIVERS—MICHIGAN.

LIGHT-HOUSE ESTABLISHMENT,
OFFICE OF THE LIGHT-HOUSE INSPECTOR, 10TH DISTRICT,
BUFFALO, N. Y., July 2, 1900.

Notice is hereby given that Pilot Shoal in the St. Lawrence River, New York, about ⅓ mile below Sister Islands Light-House, has been removed to the depth of 18 feet.

Consequently, the Pilot Shoal Buoy (a 20 foot spar buoy with red and black horizontal stripes) being no longer necessary, it will be discontinued about August 1st, 1900.

This notice affects the "List of Beacons, Buoys and Day Marks of the U. S. on the Northern Lakes and Rivers" for 1900, page 17.

By authority of the Light-House Board.

FRANKLIN HANFORD,
Inspector 10th L. H. District. Commander, U. S. N.

TREASURY DEPARTMENT,
OFFICE OF THE LIGHT-HOUSE BOARD,
WASHINGTON, D. C., June 28, 1900.

LAKE MICHIGAN—NORTHERLY END. Notice is hereby given that, on or about July 10, 1900, changes, as follows, will be made in the aids to navigation, marking Simmons Reef and Lansing Shoal, northerly end of Lake Michigan:

SIMMONS REEF.—Light Vessel No. 55, now moored to the southward of this reef, will be permanently withdrawn and the reef will be marked by a gas-lighted buoy, painted red and showing a fixed white light. The gas buoy will be bnown as "Simmons Reef Gas Buoy," and will be located in about the same position as the present light.vessel.

LANSING SHOAL.—The gas-lighted buoy, now marking the southeasterly end of Lansing Shoal, will be discontinued and the shoal will be marked by Light Vessel No. 55, to be known as "Lansing Shoal Light Vessel, No. 55."

Lansing Shoal Light Vessel, No. 55, will show two fixed red lights, one from each masthead, and each produced by three lens lanterns encircling the masthead. The vessel has two masts, schooner rigged, with a red, oval, cagework day mark at each masthead. The hull will be red with "Lansing Shoal" in white on each side and "55" in white on the stern.

During thick or foggy weather a 6-inch steam whistle will sound blasts of 5 seconds duration, separated by silent intervals of 55 secound, thus:

Blast	Silent interval	Blast	Silent interval
5 sec.	55 sec.	5 sec.	55 sec.

By order of the Light-House Board.

FRANCIS J. HIGGINSON,
Rear Admiral, U. S. N., Chairman.

DEPARTMENT OF MARINE AND FISHERIES,
OTTAWA, CANADA, 22nd June, 1900.

DOMINION OF CANADA—ONTARIO.

I. TEMPORARY LIGHTS AT PORT BURWELL.—The breakwater piers at the entrance to Port Burwell, on the north shore of Lake Erie, are being extended by the Department of Public Works of Canada, and it is understood that while the work is going on, temporary lights are being maintained on the outer end of both piers; that on the west pier is shown from a lantern suspended from a post at a height of 8 feet above the level of the lake; the other is maintained at a height of 5 feet above the lake level over a sunken crib which forms the sub-structure of the east pier extension. It is intended to keep the lights in position during the continuance of the work. In very stormy weather it may not be possible to light the lamps.

II. ROCK NORTH OF CLAPPERTON ISLAND.—Mr. Henry F. Baker, lightkeeper at Clapperton Island, reports having found a small rock with only 13½ feet water on it to the eastward of Robertson Rock, north of Clapperton Island, north channel of Lake Huron. He states that the rock is near the middle of the channel, but does not more clearly indicate its position. Mariners are warned to be careful in passing this point.

F. GOURDEAU,
Deputy Minister of Marine and Fisheries.

☞ All bearings, unless otherwise noted, are magnetic and are given from seaward, miles are nautical miles, heights are above high water, and all depths are at mean low water.

Pilots, masters or others interested are earnestly requested to send information of dangers, changes in aids to navigation, notices of new shoals or channels, errors in publications, or any other facts affecting the navigation of Canadian waters to the Chief Engineer, Department of Marine and Fisheries, Ottawa, Canada.

A JUST RETRACTION.

Capt. J. G. Keith writes the following letter to the News Tribune, which explains itself:

CHICAGO, June 25, 1900.

The Sunday News-Tribune, Duluth, Minn.:

I noticed an article in your issue of yesterday purporting to have originated from me wherein I was made to say that the drainage canal had been the cause of lowering the level of Lake Michigan five inches, whereas, the truth is there appeared an article in the Inter-Ocean of the 19th over my signature, as you have stated, that was never written by me or any part of it. I regret that I should have been made to appear the author of such a ridiculous assertion. They promised me to correct the article but had not the courage to print such a flat refutation of an article written by them over my name. But coming from that source the offense is less than it would be from a reputable journal. Yours, etc.,

J. G. KEITH.

The News-Tribune printed the statement complained of in an article received from its special correspondent in Chicago, there being nothing in the statement that would lead to any suspicion of inaccuracy.

The News Tribune much regrets that it should have, by inadvertence, done Capt. Keith the injustice to publish unfounded statements about him or any other so well known and reputable a gentleman as Capt. Keith.

VESSELS CLASSED.

Vessels classed and rated this week by the American Bureau of Shipping in the "Record of American and Foreign Shipping," New York: Screw, Lassell; owned by Messrs. McCaldin Bros. Tern, Crescent; barge, C. R. R. of N. J. No. 15. British schooner, Baden Powell.

EASTERN FREIGHTS.

Messrs. Funch, Edye & Co., New York, report the condition of eastern freight market as follows:

The great advance in our grain prices, to which we referred last week, having been followed by fluctuations in the grain markets, all fresh purchases have stopped for the present, so that charters for grain have ceased to be a factor in our freight market. In consequence, however, of the comparatively short supply of steamers, especially for prompt delivery, freight rates for boats for timber, for coal and for general purposes have been well maintained, and without exhausting the enquiry for tonnage for various branches of trade.

We are unable to state the slightest change in the market for sail tonnage, and consequently find ourselves this week without a single item of interest to report.

UNITED STATES COMMERCE.

"The Commercial Ascendancy of the United States" is set forth in the July Century by the Hon. Carroll D. Wright, United States Commissioner of Labor.

The industrial ascendancy of the United States has long been assured. According to careful estimates, the production of manufactured goods the present year will reach at least the value of $12,500,000,000. This sum is considered to be at least $450,000,000 in excess of the manufactured products of the United Kingdom and Germany, the chief competitors of the United States. The United Kingdom not many years ago held not only the ascendancy in manufactured goods in the world, but the supremacy. The United States has encroached rapidly upon that position until in many great lines her products vastly exceed those of Great Britain, while in the total they are much in excess. It took many years of the introduction of most improved methods, the application of highest skill, and all the energy of our iron-manufacturers to bring the production of pig-iron up to that of our great competitor, but for several years the amount of production in the United States has led that of England. The latest returns for this country show a production of nearly 12,000,000 long tons of pig-iron, while the production for Great Britain for the same period was 8,631,151 gross tons. The iron trade is basic in its nature, and, as a rule, when it flourishes all other industries flourish.

In the great field of agriculture, ascendency has long been accorded to this country, and the United States has furnished the food-products to sustain the work of her great competitors in manufactures. According to Mr. Michael Mulhall, the United States employs the greatest number of persons in agriculture of all the great countries except Austria, where 12,000,000 persons are employed. Germany comes next to the United States, and then France. The productivity of the agricultural labor of the different countries varies greatly, however, according to the same authority, an ordinary farm-hand in the United States raises as much grain as three in England, four in France, five in Germany and six in Austria, which shows that an enormous waste of labor occurs in Europe, largely because the farmers are not possessed of the mechanical appliances used in the United States. This is seen when we examine the production of grain per capita of the persons employed. In the United States it is 350 bushels, in the United Kingdom 119, in France 98, in Germany 75, in Austria 64 and in Italy 39.

There is not so much variation in the productivity in manufactures as in agriculture, but, still, in the use of machinery it is great enough to give ascendancy to this country. In the United States it is 1940 foot-tons per inhabitant, in Great Britain 1470, in Germany 902, in France 910, in Austria 560 and in Italy 380. In these statements we find the basis for the phenomenal commercial expansion of the last few years.

It is only natural when considering this industrial ascendancy of the United States, that one should consider the question as to whether commercial ascendancy has either been reached or is in sight. To secure commercial ascendancy, the exports of a country must be greater than those of any other country; for the total exports of a country indicate its true position in commerce, as they usually consist of surplus products.

Taking the domestic exports from this country for the year ending March 31, the present year, we find that they are $1,309,142,217. British statistics for the same date are not at hand, but as British exports have not been increasing of late very rapidly, it is safe to conclude that at the present time the exports of the United States exceed those of any other country in the world.

The name of the steam yacht Enquirer, formerly owned by W. J. Connors, of Buffalo, has been changed to Search. She will be used by Col. Lydecker during his tours of inspection throughout his district.

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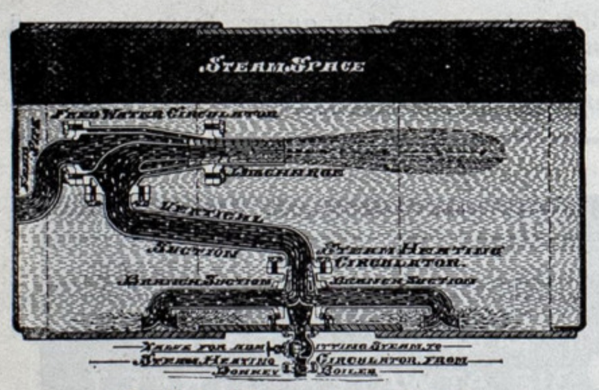

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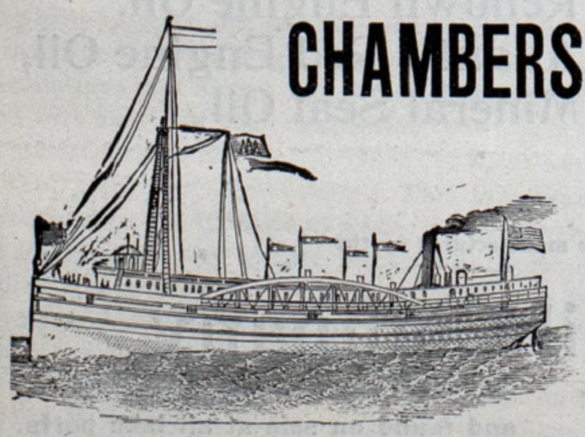

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Government Proposals.

U. S. ENGINEER OFFICE, Galveston, Tex., July 10, 1900. Sealed bids, in triplicate, for improving harbor at Brazos Santiago, Tex., by hire of dredging plant, will be received until 2 p. m., July 30, 1900, and then publicly opened. For information apply to C. S. RICHE, Capt., Engrs.

U. S. ENGINEER OFFICE, Buffalo, N. Y., June 20, 1900. Sealed proposals for construction of concrete superstructure on south pier at Buffalo, N. Y., will be received here until 11 a. m., July 10, 1900, and then publicly opened. Information furnished on application. T. W. SYMONS, Major, Engrs. 25-27

TREASURY DEPARTMENT, Office of General Superintendent U. S. Life-Saving Service, Washington, D. C., June 18, 1900. Sealed proposals will be received at this office until 2 o'clock p. m. of Thursday, the 12th day of July, 1900, and then publicly opened for furnishing supplies required for use of the Life-Saving Service for the fiscal year ending June 30, 1901; the supplies to be delivered at such points in New York City, Grand Haven, Mich., and San Francisco, Cal., as may be required, and in the quantities named in the specifications. The supplies needed consist of beds and bedding, blocks and sheaves, cordage, crockery, furniture, hardware, lamps, lanterns, etc.; lumber, medicines, etc.; paints, oils, etc.; ship chandlery, stoves, etc.; tools, and miscellaneous articles; all of which are enumerated in the specifications attached to the form of bid, etc., which may be obtained upon application to this office, or to the Inspector of Life-Saving Stations, 17 State street, New York City; Superintendent Eleventh Life-Saving District, Grand Haven, Mich.; and Superintendent Twelfth Life Saving District, New Appraisers' stores, San Francisco, Cal. Envelopes containing proposals should be addressed to the "General Superintendent U. S. Life-Saving Service, Washington, D. C.," and marked on the outside "Proposal for Annual Supplies." The right is reserved to reject any or all bids, and to waive defects, if deemed for the interests of the government.

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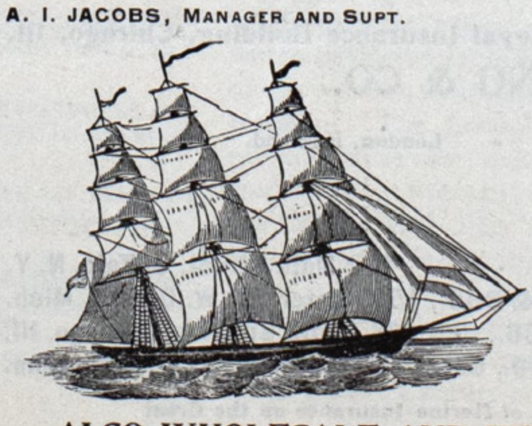

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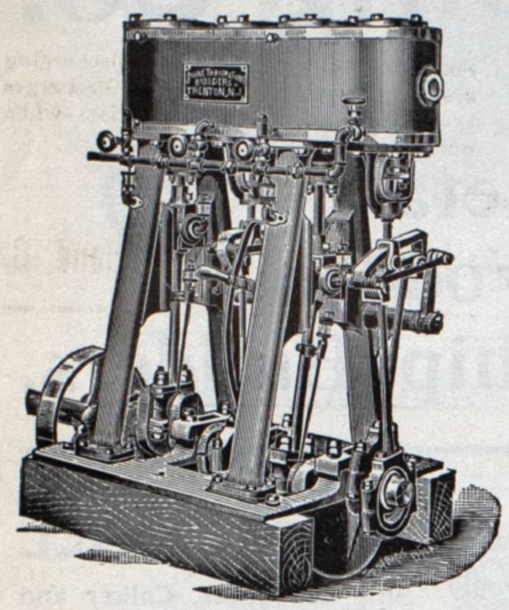

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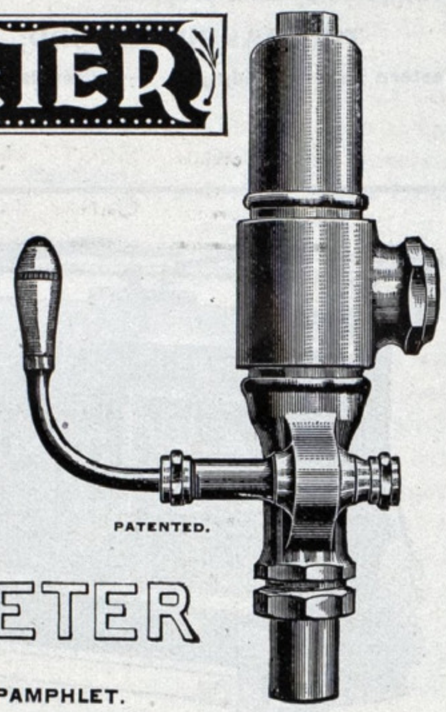

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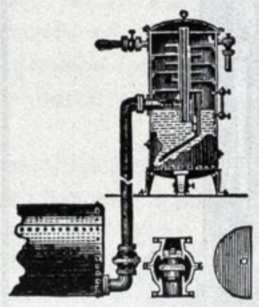

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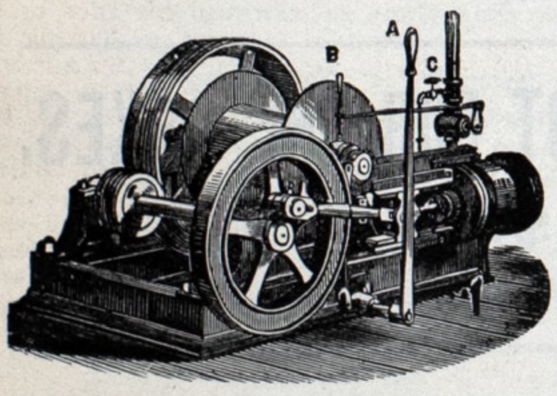

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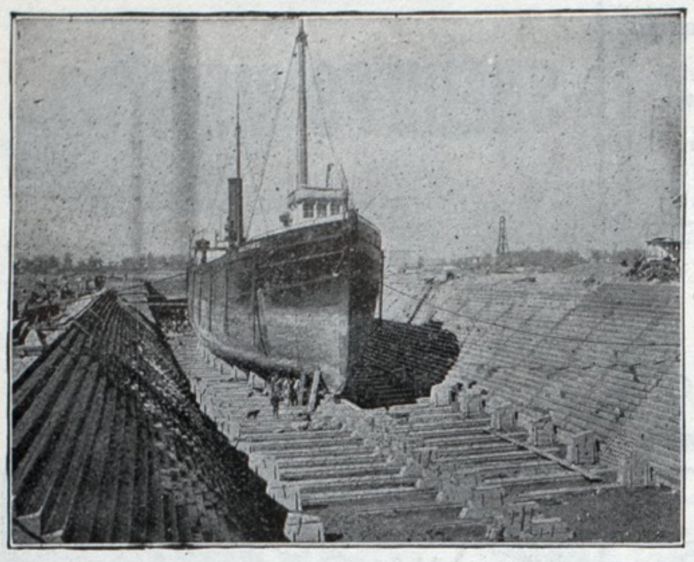

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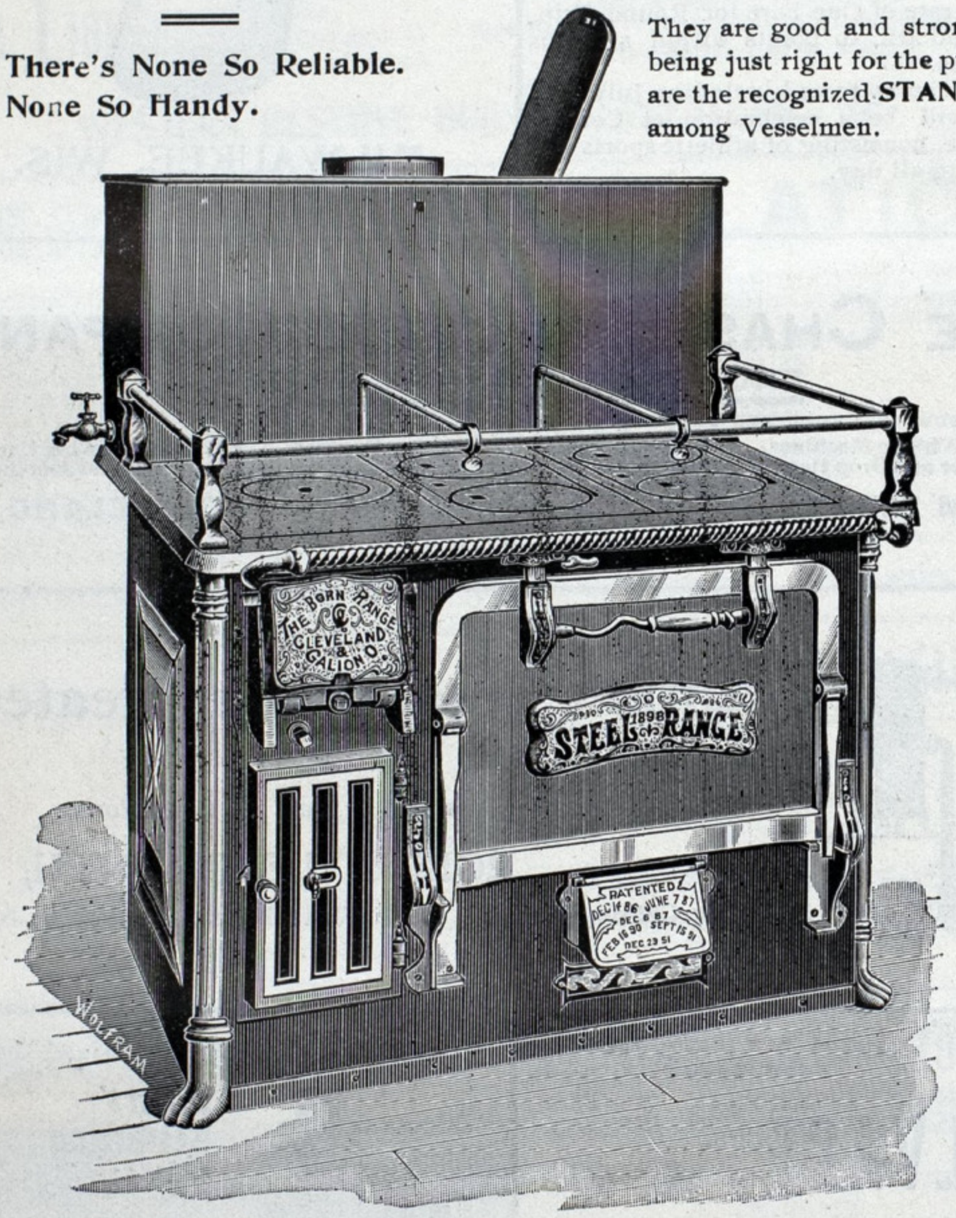

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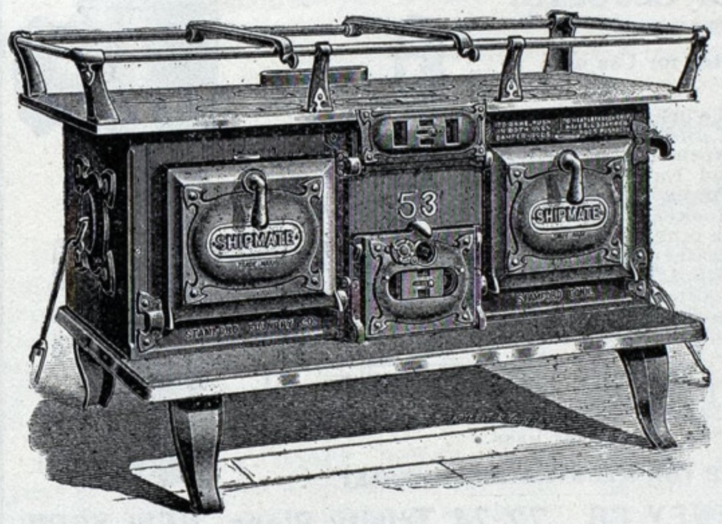

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